

5-10-2015

Formative Assessment Strategies: Levels of Use by High School English and Mathematics Teachers

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FORMATIVE ASSESSMENT STRATEGIES: LEVELS OF USE BY HIGH SCHOOL ENGLISH AND MATHEMATICS TEACHERS

Danielle L. Hauser

154 Pages

August 2015

The levels of use of formative assessment strategies and types of feedback by high school English and mathematics teachers were examined. A non-experimental, quantitative survey approach was used to test whether the levels of use of formative assessment strategies vary by content area taught (English vs. mathematics), teacher's perceptions of their knowledge of these practices, and other teacher demographics (e.g., gender, years of experience, degrees/qualifications). Survey items on formative assessment strategies included specific items from *Classroom Assessment for Student Learning Doing It Right – Using It Well*. Feedback survey questions were based on Nyquists' typology of feedback. One-hundred twenty-five surveys were returned by junior-level English and Algebra 2 mathematics teachers, with 106 participants (85%) fully completing the survey. The findings of this study revealed teachers' self-perception of their knowledge of formative assessment practices and participation in professional development activities had a significant association with their level of use of such strategies. In addition, content area taught (English or mathematics) did have a significant association with the type of feedback provided to students most often. Overall, teachers are not always using effective formative assessment strategies during instruction.

FORMATIVE ASSESSMENT STRATEGIES: LEVELS OF USE BY
HIGH SCHOOL ENGLISH AND MATHEMATICS TEACHERS

DANIELLE L. HAUSER

A Dissertation Submitted in Partial
Fulfillment of the Requirements
for the Degree of

DOCTOR OF EDUCATION

School of Teaching and Learning

ILLINOIS STATE UNIVERSITY

2015

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FORMATIVE ASSESSMENT STRATEGIES: LEVELS OF USE BY
HIGH SCHOOL ENGLISH AND MATHEMATICS TEACHERS

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ACKNOWLEDGMENTS

I have been blessed to have the support of many throughout my doctoral journey. Their faith, support, guidance, and love gave me the courage, strength, wisdom, and perseverance to complete this journey. First, I would like to extend a sincere thank you to my committee Dr. Steven Mertens, Dr. Nancy Latham and Dr. Elizabeth White. I am fortunate to have had the opportunity to learn from all of you. A special thank you to Dr. Steven Mertens for serving as my committee chair, providing advice, displaying extreme patience, and spending a generous amount of time making sure I understood next steps. Dr. Mertens was a critical source of reason, encouragement, and strength to keep going.

Without the support of my husband, Erik, I would not have completed this journey. Your enduring love, support, and patience gave me the time and motivation to complete this process. To my children, Braden and Ryan, whose love and encouragement provided motivation and strength, thank you for your patience and understanding throughout the weekends and night's mom had her face in the books or at the computer reducing my time with you. I am looking forward to rededicating my time with my family and enjoying every minute. I hope I have inspired my children to value and appreciate education.

My family and friends have been extremely understanding, patient and supportive. A special acknowledgement to my Gram, who taught me the value and importance of education, watching her graduate from a university, was an inspiration.

I would like to acknowledge ALL my Palatine cohort friends in the doctoral program, particularly Christina and Kerri for the ongoing support, encouragement and advice they all offered throughout the entire process.

D. L. H.

CONTENTS

	Page
ACKNOWLEDGMENTS	i
CONTENTS	iii
TABLES	vi
FIGURES	viii
CHAPTER	
I. THE PROBLEM AND ITS BACKGROUND	1
Statement of Problem	6
Research Questions	8
Purpose and Significance of Study	9
Local Context	10
Conceptual Framework	11
Limitations of Study	13
Definitions of Relevant Terms	13
Organization of Study	15
II. REVIEW OF RELATED LITERATURE	17
Common Core Standards	18
Assessments	20
Assessment Design	22
Formative and Summative Assessment	24
Formative Assessment Process	28
Assessment for Learning	30
Feedback	34
Attributes of Feedback	35
Feedback Loop	42
Typology of Feedback	44

Implications of Formative Assessments on Attainment of Standards	48
Summary	49
III. RESEARCH METHODOLOGY	51
Research Questions	52
Research Design	55
Research Setting	57
Study Sample	59
Accessibility to Data Collection	59
Value of Specific Methodology	60
Instrumentation	62
Independent Variables	64
Dependent Variables	64
Reliability and Validity	65
Data Collection Procedures	67
Data Analyses Procedures	69
Variables	70
Research Questions	71
Limitations	74
Ethical Considerations	75
IV. RESEARCH FINDINGS	77
Research Questions	79
Results	79
Demographics of Participants	80
Use of Formative Assessment Strategies	83
Research Question 1a	85
Research Question 1b	88
Research Question 1c	91
Research Question 1d	94
Research Question 1e	97
Research Question 1f	104
Research Question 1g	105
Research Question 1h	108
Conclusion	112

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	114
Findings and Discussion	115
Limitations	124
Future Research	126
Recommendations	128
Concluding Remarks	129
REFERENCES	132
APPENDIX A: Survey Instrument	140
APPENDIX B: Informed Consent	148
APPENDIX C: Teachers Responses to Formative Assessment Strategy Questions	149
APPENDIX D: Teachers Responses to Type of Feedback Questions	153

TABLES

Table	Page
1. Seven Strategies of Assessment for Learning	12
2. Feedback Strategies	41
3. NCLB Subgroup Percentages in the Suburban High School District	57
4. Sources for Survey Questions	63
5. Participant Demographic Distribution	81
6. T-tests for Differences in Content and Level of Use of Formative Assessment Strategies	86
7. Teachers Response to Which Type of Feedback Provided Most Often	86
8. Prevalence in Content and Type of Feedback Provided Most Often	87
9. Prevalence in Course Level and Content	88
10. Mean Differences in Course Level and Formative Assessment Strategies	90
11. Mean Differences in Course Level and Level of use of Types of Feedback	91
12. ANOVA for differences in Number of Preps and Level of use of Formative Assessment Strategies	92
13. Mean Differences in Number of Preps and Level and Use of Type of Feedback	93
14. Mean Differences in Teacher's Perceptions of Their Own Knowledge of Formative Assessment Strategies and Level of Use of Formative Assessment Strategies	95
15. Prevalence in Perceptions of Knowledge of Formative Assessment Strategies and Professional Learning Activities	96

Table	Page
16. Prevalence in Perceptions of Knowledge of Formative Assessment Strategies and Degrees Earned	97
17. Prevalence in Content and Gender	98
18. T-tests for Differences in Gender and Level of Use of Formative Assessment Strategies	98
19. Mean Differences in English Teachers' Responses between Formative Assessment Strategies and Gender	99
20. Mean Differences in Mathematics Teachers' Responses between Formative Assessment Strategies and Gender	102
21. Mean Differences in Years of Teaching Experience and Level of Use of Formative Assessment Strategies	105
22. T-test for Differences Teacher Qualifications (specifically Master's Degree) and Level of Use of Formative Assessment Strategies	107
23. T-test for Differences Teacher Qualifications (specifically NBCT) and Level of Use of Formative Assessment Strategies	108
24. Prevalence in Content Area and Professional Learning Activities	109
25. T-test for Differences in Professional Learning Opportunities and Level of Use of Formative Assessment Strategies	110

FIGURES

Figure	Page
1. Practical Model of Assessment and Evaluation System	26
2. Aspects of Assessment for Learning	31
3. A Model of Feedback to Enhance Learning	39

CHAPTER I

THE PROBLEM AND ITS BACKGROUND

Imagine, you are a teacher and you were just notified that your students' performance on a future assessment will be used to determine part of your performance rating for employment. Think about the number of times you created an assessment the day before you administered it to your students. In the previous scenario, the assessment is an instructional afterthought (Popham, 2011). As a result, the emphasis on particular questions may not match the emphasis placed on the topic or standard during the learning. Or, how often have you given an assessment, recorded the scores, and moved on to the next learning goal or objective, not addressing students' misconceptions about the prior material. Oftentimes what is being assessed comes as a complete surprise to students because teachers believe that should be kept a secret (Guskey, 2003). We can all think of teachers that had the "gotcha" questions, or forgot to remove questions where the content had not been taught, or the questions to make sure students read the information in the margins of text.

Will these practices change when teacher performance ratings are based in part on student growth? Wiggins (1998) suggested "...excellent teachers depends on accountability" (p. 289). Teachers have expressed, "I taught them, why didn't they learn it?" In accountability, effectiveness will not be made based on how the teacher taught the material, but rather what the students were able to demonstrate (Guskey, 2003).

Assessments and accountability are not new ideas or innovations to the education field. After a *Nation at Risk* (National Commission on Excellence in Education, 1983) and the movement to improve schools, assessment became about accountability and measuring schools. Decisions about assessments, particularly high-stakes assessments, tended to be accompanied with political movements or decisions (Broadfoot & Black, 2004; Stiggins & Chappuis, 2006; Reeves, 2007). In the 1990s, assessment practices were implemented to support and promote accountability of schools, “labeling” students as successful and unsuccessful (Burke, 1999; DeLuca & Bellara, 2013; Stiggins, 2006). Popham (2003) suggested that assessment results be used by both educators and non-educators to draw conclusions about learning and the effectiveness of the instruction. The power and impact of assessments is driven by the connection between assessment quality and effective use of assessment results (Stiggins, 2009). Assessing students determines what content, skills, knowledge students retained (Popham, 2004).

Broadly defined, the term, “assessment” encompasses a variety of methods and practices to assess student knowledge (Popham, 2011). Assessments include, but are not limited to, classroom assessments, high-stakes assessments, portfolio assessments, and common assessments administered across more than one classroom (Broadfoot & Black, 2004). Over the years, the terms tests, measurements, and assessments have been used interchangeably (Popham, 2004). Popham (2011) defines assessment as a formal process to gather information regarding students’ learning status. More specifically, assessments are learning tools used to gather information on what students are learning which educators attempt to derive valid inferences about what students know or are able to do (Pellegrino, 2012; Popham, 2003). Greenstein (2010) focuses not only on the definition

of assessment but also the process.

Broadfoot and Black (2004) suggested assessments are a communication tool providing information on the quality of student learning, the curriculum, programming, or school. Students, parents, educators, analyze the student performance results for the purpose of improvement of teaching and learning (Greenstein, 2010). One way assessment results are used as a communication tool to parents and students is through grades (Popham, 2011). Sometimes, assessment results are used to compare students' scores from one point to another, one student to another or groups of students (Greenstein, 2010).

Assessment results are used for a variety of purposes, a single assessment result does not always inform the stakeholders on the learning progress or the effectiveness of a program (Marzano, 2010a). There are both internal and external factors that can have an impact on how students' perform on any given assessment which can present challenges to interpreting assessment results. External challenges impacting student achievement include but are not limited to poverty, nutrition, parents' level of education, family relationships, academic habits and support systems (Ainsworth & Viegut, 2006; Reeves, 2007). Internal challenges include teachers understanding of assessment literacy (Guskey, 2003). It is for all these reasons educational experts such as Stiggins (2008), Erkens (2012), Heritage (2010), (2006), Reeves (2007) have written about the use of a balanced assessment system to draw inferences and conclusions on student learning. Aligning local, state and national assessments will assist in predicting how students will perform at the next level of assessment (Reeves, 2007).

The original purpose of assessments was to audit learning, and has now evolved to include educating and improving student performance (Wiggins, 1998). Popham (2011) suggested teachers should be concerned about assessments for three reasons: (1) how the public draws conclusions between assessment results and educational effectiveness, (2) evaluation of teachers and (3) assess the instructional intentions. An assessment is the bridge between teaching and learning (Fisher & Frey, 2007). Erkens (2014) explained how assessments can move learning forward.

Assessment *is* teaching. To teach without engaging in profound and accurate assessment processes, day-by-day and moment-by-moment, is to engage in *curriculum coverage*. The measure of teaching, then, must be based in whether or not the learning happened. The only way to assure the learning happens is to design the architecture of assessments and assessment processes (from the preplanned and obtrusive assessments to the in-the-moment and unobtrusive assessment processes) that scaffold our way to success. We must begin with the end in mind. (p.1)

Bloom's research (1964), suggests that effective teachers use classroom assessments as a vital learning tool (Guskey, 2005). Why do we assess? Stiggins (2004) suggested two reasons: (1) to gather evidence to inform teaching and learning, and (2) to motivate learning. Stiggins (2004) defined the difference between "assessment of learning" and "assessment for learning."

Assessment of learning or summative assessments tend to be administered at the end of learning (e.g., unit assessment, semester assessment, final exam) and are comprehensive in nature (Erkens, 2012; Stiggins, 2004). The purpose of summative

assessments is to evaluate curriculum, programs, or judge student competency on standards (Fisher & Frey, 2007). Summative assessments provide information for educators to evaluate completed instructional activities (Popham, 2011). Teachers review assessment results to improve instruction for future students rather than current students (Ainsworth & Viegut, 2006).

Assessment for learning or formative assessment engages students in process to improve their learning. Looking at assessments as more than gauging student learning, but in addition, providing students' information to continue their learning is what differentiates these two types of assessment. Formative assessments practices or assessment for learning, conducted during the learning process promote student success because they are meant to support learning (Stiggins, 2005). Formative assessments help identify student misconceptions and then allow teachers to develop plans to uproot the misguided knowledge with the accurate information (Chappuis, 2015).

One of the assessments for learning strategies that engages students in their learning is feedback. In the simplest terms, feedback confirms or corrects responses (Tunstall & Gipps, 1996). Feedback is a necessary step in the learning process to progress and enhance learning (Marzano, 2010b; Tunstall & Gipps, 1996). Feedback is part of a continual process correcting or confirming student academic knowledge, it is not isolated to one instructional activity, as it should connect to another learning event (Langer, 2011).

Hattie (2009) suggests that feedback is the most powerful influence on achievement. Feedback has the potential to have the "Nintendo effect" (DuFour, Eaker & DuFour, 2005). Have you ever watched someone play a video game? With every

movement comes timely, accurate, and specific information that the player can respond to earn more points or make it to the next level. The individual may not get to the next level, but the process continues until the player's goal is achieved. Wilhelm (2013) suggests teachers might ask themselves what the purpose of feedback is and what kind of feedback they provide to students. More importantly, what feedback is useful to students? Hattie and Timperley (2007) suggest feedback is either a positive or a negative powerful influence on learning. Feedback is not simply about giving rewards (Hattie, 2009), it is about providing specific information to the student regarding where they are in their learning process and what they need to do to continue the learning (Brookhart, 2008; Erkens, 2012). This research study will examine types of feedback that enhance learning.

Statement of Problem

Studies have indicated that assessment for learning, and more specifically the assessment for learning strategy, has had a significant impact on student learning (Black & Wiliam, 1998b; Bloom, 1984; DuFour, Eaker & DuFour, 2005; Hattie & Timperley, 2007; Meisels, Atkins-Burnett, Xue, Bickel, Son, & Nicholson, 2003; Nyquist, 2003; Rodriquez, 2004). However, what type of feedback produces the highest percentage of students' attainment of academic standards? The purpose of this non-experimental, survey research design is to investigate whether or not differences exist in the implementation of formative assessment strategies by English and mathematics teachers. To examine this, a clear definition of formative assessment should be established. However, according to Popham (2008), finding a universally accepted definition and characteristics of formative assessment is a difficult task. Some definitions of formative

assessment focus on assessment type, while others focus on assessment function. These differing foci can cause great variation in defining the term (Black & Wiliam, 2003).

The purpose of feedback is to reduce discrepancies in learning (Hattie & Timperley, 2007). If “feedback is a consequence of learning” (Hattie, 2009, p.174), meaning it is a natural part of the process, it is important to understand the impact feedback has on the learning process. Hattie (2009) has reported considerable amount variability in the types of feedback and its impact on learning. The most effective feedback provides cues to the students to either reinforce the learning or correct the learning. A simplistic purpose or function of feedback is to correct errors (Kulhavy, 1977). According to Kluger and Denisi (1991) when feedback is reported as a grade, it is not helpful in improving learning; however, they found that feedback improved learning 60% of the time. Kulhavy (1977) suggests that the relevant literature does not provide a decisive conclusion with evidentiary support to conclude there is a difference in student assessment performance when the student was provided simple or complex feedback. One factor could be in whether or not students receive or interpret the feedback (Hattie, 2009). Nyquist (2003) deduced five types of feedback through conducting a meta-analysis:

1. Weaker feedback only, the students are simply given only a grade or score.
2. Feedback only, students are not only provided a grade or scores, but also they are provided clear statements on corrective knowledge to correct their answers.
3. Weak formative assessment, students are given both information about the correct response and some explanation.

4. Moderate formative assessment includes the information defined in the weak formative assessment and suggestions for improvement .
5. Strong formative assessment includes everything stated previously and students are assigned specific activities to improve student understanding of the concepts.

Teachers need to be presented with data that will be helpful in understanding and determining the impact of formative assessment strategies, with a focus on the types of feedback provided to students. We know feedback happens after learning, however, Hattie (2009) suggests more research is needed to determine how feedback works in the learning process. Though there is a large body of research on feedback, the consistency in the findings is not present. According to Shute (2009) there are conflicting findings regarding the impact of feedback.

Research Questions

This study will examine the levels of use of formative assessment strategies in high school English and mathematics courses. The research questions that will guide this study are:

1. What are the levels of use of formative assessment practices for high school English and math teachers?
 - a) Do the levels of use of formative assessment practices vary by content area taught (i.e., English teachers vs. math teachers)?
 - b) Do the levels of use formative assessment practices vary by course type within subject area (i.e., accelerated courses vs. developmental courses)

- c) Do the levels of use formative assessment practices vary by the number of different courses taught?
- d) Do the levels of use formative assessment practices vary by teacher's perceptions of their knowledge of these practices?
- e) Do the levels of use formative assessment practices vary by gender?
- f) Do the levels of use formative assessment practices vary by years of teaching experience?
- g) Do the levels of use formative assessment practices vary by teacher degrees/qualifications?
- h) Do the levels of use formative assessment practices vary from participation in professional learning activities?

Purpose and Significance of Study

Over the course of the next three years, per the Performance Evaluation Reform Act (PERA), waves of school districts in Illinois will incorporate student growth into teachers' final evaluation rating (Illinois State Board of Education [ISBE], 2014). The Illinois State Board of Education defines student growth as "a demonstrable change in a student's or group of students' knowledge or skills, as evidenced by gain and/or attainment on two or more assessments, between two or more points in time." (ISBE, 2014, p. 8). This Act shifts accountability of schools directly to the individual teacher. Because of its importance as a metric of learning, teachers will likely want to know how they can produce the greatest percentages of students who demonstrate academic growth or Core Standard achievement. Stiggins (2002) stated that, if we wish to increase student achievement, then we must pay greater attention to improving classroom assessment.

Given that formative assessment strategies and feedback have the potential to increase student achievement (Black & Wiliam, 1998a, Wiliam, Lee, Harrison & Black, 2004); this study aims to identify potential differences in the level and use of formative assessment strategies with an emphasis on the level of feedback provided to students by English and mathematics high school teachers. The results could impact professional learning opportunities with the objective of providing instructional tools that impact student attainment of learning standards.

Local Context

The movement to use student performance data continues to grow. The articulation of the achievement of standards (e.g., Common Core) and school accountability is being measured through the use of both norm-references and criterion-referenced assessments as well as formative and summative assessments (Stiggins, 2002). In 2009, the Race to the Top initiative was introduced (DeLuca & Bellara, 2013; Office of the Press Secretary, 2009). States were required to develop and adopt common standards (Common Core Standards) while also focusing on developing high quality formative assessments. The Illinois State Board of Education was awarded a Race to the Top federal grant in 2011. Race to the Top requires states to adopt more rigorous standards and formative assessments (ISBE, 2014). In addition, teachers and administrators are going to be evaluated based on student growth. The Performance Evaluation Reform Act (PERA) requires school districts to use student performance data to evaluate and improve teaching (Illinois Administrative School Code Part 50, 2014).

The school district where this research project will take place is in the pilot administration of the student growth component of the teacher evaluation system.

Teachers are focused on gaining background knowledge and information on how to increase student learning as it will have a direct impact on their teacher evaluation rating. During the 2015-16 school year, the school district will officially implement the student growth component of the teacher evaluation system. Because of its importance as a metric of learning, teachers will likely want to know how they can produce the greatest percentages of students who demonstrate academic growth or Core Standard achievement.

Stiggins (2002) stated that if we wish to increase student achievement, then we must pay greater attention to improving classroom assessment. The school district has not provided district-wide professional development on assessment development or the importance of feedback nor has it been a district-wide initiative. However, the district has offered intensive professional development by Cassandra Erkens (author and presenter on assessment, instruction, and school improvement) to instructional leaders across the district with the hopes the knowledge gained would be shared.

Conceptual Framework

The importance of a conceptual framework is to articulate an expected outcome based on a specified intervention. As the basis for a conceptual framework, this study will employ the seven strategies of assessment for learning. Table 1 contains the seven strategies articulated by Chappuis (2015) that provide direction for effective research-based practices on the use of classroom assessments. This research effort will help provide understanding and insight as to whether or not teachers are employing strategies of assessment for learning. Assessments are more than a one-time isolated event; they have evolved into a series of assessment that are an integral part of the learning process

(Stiggins, 2006). Formative assessment strategies keep students engaged in the learning process (Chappuis, 2015; Stiggins, 2006).

Table 1

Seven Strategies of Assessment for Learning

Where am I going?

Strategy 1: Provide students with a clear and understandable vision of the learning target.

Strategy 2: Use examples and models of strong and weak performance.

Where am I now?

Strategy 3: Offer regular descriptive feedback.

Strategy 4: Teach students to self-assess and set goals.

How can I close the gap?

Strategy 5: Design lessons to focus on a single learning target or aspect of quality at a time.

Strategy 6: Teach students focused revision.

Strategy 7: Engage students in self-reflection and let them keep track of and share their learning.

Adapted from Chappuis, J. (2009). *Seven strategies of assessment for learning*. Boston: Allyn & Bacon.

Strategy three focuses on providing descriptive feedback. Hattie and Timperley (2007) reported, “those studies showing the highest effect sizes involved students receiving information feedback about a task and how to do it more effectively. Lower effect sizes were related to praise, rewards, and punishment” (p.84). As a result, Hattie

and Timperley drew the conclusion feedback was a process that answered three questions: Where am I going?; How am I going?; and Where to next?

In order to help differentiate between formative and summative types of evaluation and types of assessment, I will use the Practical Model of Assessment and Evaluation Systems (Dunn & Mulvenon, 2009) outlined in Chapter 2. Simply put, formative and summative evaluation can be applied to summative and/or formative assessments. It is the evaluation that indicated the action or next steps (Dunn & Mulvenon, 2009). Bloom was one of the first to apply the concepts of formative versus summative to educational assessment thus laying the groundwork for reviewing whether or not students are proficient on identified standards (Bloom, Hastings, & Madaus, 1971).

Limitations of Study

Limitations of this study provide potential internal threats. The study is limited to high school English and mathematics teachers teaching specific courses from a suburban school district in the northwest suburbs of Chicago. Therefore, the research findings may not be generalizable to other levels of education content areas, or less affluent schools. However, the findings will inform other educators and could lead to potential studies that will expand the population pool. Another limitation of this research is the survey measure used for this research. Every attempt was made to locate and utilize an existing survey. Since the survey instrument will be modified or combined, the original validity and reliability cannot be assumed (Creswell, 2014).

Definitions of Relevant Terms

The following glossary of terms may be used to enhance the reader's understanding of this research project.

Assessments: For the purpose of this research the general term assessment represents instruments used to collect academic information.

Critical Learning Standards: Content area standards defined by content specific department members based on local, state, and national standards within the curricular area. These standards are also known as power standards. Ainsworth and Viegut (2006) define power standards as prioritized learning outcomes for a specific course or grade that must be taught and assessed during the duration of the course. In addition, sufficient time is provided for the instruction of the standards. Course critical learning standards are approved by the local Board of Education within this school district used for the purpose of this research.

Feedback: Brookhart (2008) suggests feedback is two-way directional. The teacher provides specific information to the student in regards to the student's learning and in turn the student knows exactly what to do to reach the identified level of learning. Chapter 2 outlines effective feedback strategies. Feedback can range from comments or grades that are not descriptive but evaluative to providing specific information to the identified learning standard or performance (Hattie & Timperley, 2007; Stiggins & Chappuis, 2006).

Formative Assessment or Assessment for Learning: Chappuis (2015) suggests formative assessment are both "formal and informal processes teachers and students use to gather evidence" of student learning (p. 5).

Formative Evaluation: According to Dunn and Mulvenon (2009), formative evaluation is the "evaluation of assessment-based evidence for the purposes of providing

feedback to and informing teacher, students, and educational stakeholders about the teaching and learning process” (p. 4).

Summative Evaluation: According to Dunn and Mulvenon (2009), summative evaluation is the “evaluation of assessment-based data for the purposes of assessing academic standing relative to some established criterion” (p. 4).

Summative Assessment or Assessments of Learning: Chappuis (2015) defines as an assessment “that provides evidence of student achievement for the purpose of making a judgment about student competence or program effectiveness” (p.5).

Organization of Study

This research aims to investigate the levels of use of formative assessment strategies by high school English and mathematics courses. In this chapter, I presented the purpose of the study, operational terms, and a conceptual framework. Defining formative assessments and understanding the value of the strategies, specifically feedback has been noted to be impactful on student learning but it is not consistently a positive or negative impact on student learning.

The remaining components of this dissertation proposal include: a literature review and a methodology description of the study. Chapter II, the literature review, will establish relevant research and literature as it relates to formative assessment strategies and student learning. Chapter III, the methodology, will describe the research design and process that will be used during this study. It will outline the procedures incorporated to collect and analyze data for this quantitative research. After the proposal and IRB are approved a findings chapter and a conclusion chapter will be written. Chapter IV will present the results of study in the form of data generated and tables through the

application of the research design. Chapter V will include summaries, conclusions and recommendations for further research. It will also address the implications of the findings for the field of education.

CHAPTER II

REVIEW OF RELATED LITERATURE

Historically and traditionally, assessment practices have been used as accountability measures (Stiggins, 2006). In the 1990s, assessments were often preludes to restructuring schools (Burke, 1999). The movement to use student performance data continues to grow. Decisions about assessments, particularly high-stakes assessments, tend to be accompanied by political movements or decisions and are seen as essential for change (Broadfoot & Black, 2004; Reeves, 2007). The articulation of the achievement of standards (e.g., Common Core) and school accountability is being measured through the use of different types of assessments (e.g., formative, summative, benchmark) (Stiggins, 2002). In 2009, the Race to the Top initiative was introduced. States applied for an Elementary Secondary Education Act waiver along with applying for Race to the Top funding. The Race to the Top competitive grants required states to adopt more rigorous standards and assessments (Illinois Race to the Top, 2014). Since 2010 the Race to the Top grant has been funded by the ED Recovery Act as part of the American Recovery and Reinvestment Act (Martin & Lazzaro, 2011). Though the purpose of the grant was to spur innovation, there are clear-cut guidelines established. States are required to develop and adopt common standards (i.e., Common Core Standards) while also focusing on developing high-quality, balanced assessment systems. In addition, teachers and

administrators are evaluated based on student growth. The Performance Evaluation Reform Act (PERA) requires school districts to use student performance data to evaluate and improve teaching (ISBE, 2014). The effectiveness of a teacher is not determined by the preparation or delivery of the lesson, but instead by student performance (Burke, 1999; Guskey, 2003). Therefore, formative and summative assessment results play an integral part, as they generate evidence of student growth or attainment of academic standards (Stiggins & Chappuis, 2006). This chapter presents research findings on formative assessment practices for improving student achievement on standards.

Common Core Standards

The release of the Common Core State Standards in 2010 created an opportunity to shift towards a national curriculum (Porter, McMaken, Hwang, & Yang, 2011). Chappuis (2014) suggested that the adoption of the Common Core Standards and Next Generation Science Standards will lead to a demand for rigorous assessments. The standards are explicit regarding what students should know and be able to do. The federal government has aided the development and implementation of the Common Core State Standards, both financially and materially (Porter et al., 2011), through federal grants such as Race to the Top.

The implementation of the Common Core State Standards matches the principles of Understanding by Design (UbD). In an unpublished report, McTighe and Seif (2003) reported seven foundational points of UbD: (a) a shift from drill and practice to students' understanding and applying; (b) learning has to move beyond the rote level; (c) educators need to identify the big ideas of expected learning; (d) feedback is fundamental to learning; (e) assessments and feedback focus on more than facts and procedures, focusing

also on understanding and application; (f) the curriculum is based on depth of knowledge not breadth; and (g) assessments are used to gauge student understanding. UbD is a focused approach to deepening student understanding by maximizing the relationship and reactions between curriculum, assessment, and instruction, always starting with the end in mind (Wiggins & McTighe, 2005). As a building code is to architects, UbD is to educators; it is a conceptual framework for ensuring that students learn the intended targets. UbD is not a prescriptive plan for developing lessons; rather it is an approach to developing a curricular unit (Wiggins & McTighe, 2005). The curriculum design planning approach aims at ensuring students gain in-depth knowledge rather than surface knowledge; the difference between knowing and understanding. A curriculum takes content, such as the Common Core Standards, Next Generation Science Standards, or National Education Standards, and turns it into an understandable plan on how to meld teaching and learning effectively (Wiggins & McTighe, 2005). UbD provides guidance for putting together a curriculum map of activities and assessments resulting in students being more likely to achieve the desired results.

The Common Core Standards are based on shared expectations with a focus on standards (Porter et al., 2011). Stage 1 of UbD is identifying the desired results, determining what standards to focus on and reasons for teaching the standards. During this stage teachers determine the big ideas and essential questions: (a) What should students understand from the content? (b) What are the critical questions raised through the content? (c) What explicit or implicit skills are required for the standard? (d) What factual knowledge is required? The Common Core Standards are not intended merely to replace old standards, but instead to have a new emphasis, which educators should read

(McTighe & Wiggins, 2013). McTighe and Wiggins (2013) outlined five big ideas for implementing the Common Core Standards: (a) read the standards carefully and understand the shift; (b) be aware that standards are not the curriculum; (c) unpack the Common Core Standards; (d) start with the end in mind, map backwards from the desired results; and (e) ensure the standards are assessed in a way that leverages the understanding of one standard to meet another. During Stage 1, teachers explicitly identify the big ideas and essential questions, which is similar to identifying clear and understandable learning goals. Stage 2 focuses on students demonstrating their understanding of the identified standards. The framework for UbD is aligned with formative assessment strategies aimed at increasing student achievement; the process stresses the use of feedback for both the teacher and the student (McTighe & Seif, 2003). During Stage 3 of UbD, feedback is emphasized with a course of action that focuses on students revising, correcting, and rethinking their original responses (Wiggins & McTighe, 2005). Quality assessments are based on effective use and accurate information (Chappuis, 2004).

Assessments

The purpose of the assessment drives the assessment design (Stiggins, 2008). Teachers use assessments for many purposes, including to diagnose gaps in learning, evaluate curricula, monitor student learning, measure the effectiveness of programs or interventions, determine priorities for teaching, and assign grades. The power to use an assessment as a tool to improve learning is rooted in the relationship between the quality and effective use of an assessment (Stiggins, 2006).

Assessments are an essential and inescapable component of teaching and learning (Tomlinson, 2014). The purpose of assessments is to gather information to make judgments about student learning (Pellegrino, 2012). The three main types of assessment are diagnostic, formative, and summative (McTighe & O'Connor, 2005). However, no one assessment or assessment type can measure or capture what students know and are able to do (Tovani, 2011, 2014b). For both summative and formative assessments, teachers must (a) determine the purpose of the assessment, (b) decide which learning goals to assess, (c) create the assessment prior to instruction, (d) engage in the professional learning team process of reviewing the assessment results and data generated from the assessment, and (e) use assessments to inform student learning and classroom instruction (Black & Wiliam, 2003; Chappuis, 2015). Hattie and Timperley (2007) suggested that a typical definition of assessment is determining a student's proficiency level, placing the emphasis on scores and grades as opposed to how to interpret the scores. In this situation, teachers see the assessment results as information for the student rather than an assessment of their teaching (Timperley & Wiseman, 2002).

In 1993, the journal *Assessment in Education: Principles, Policy and Practice* was introduced and became a voice for disseminating information on assessments and assessment practices (Broadfoot & Black, 2004). Broadfoot and Black (2004) have suggested that the journal has played an integral role in the debate on the connections between assessment and learning. In 1998, Wiggins published a book, *Educative Assessment: Designing Assessments to Inform and Improve Student Performance*, which is credited with creating a shift in the focus of assessments, was from using assessments to sort and select students to using assessments to improve student learning. Educators

have moved from the terms exams and tests to assessments (Wiggins, 1998). In addition, over the decades there has been a shift from a focus on summative assessments to an assessment system that incorporates both summative and formative assessments (Ainsworth & Viegut, 2006; Reeves, 2007) and making the two types compatible (Stiggins, 2004).

Assessment Design

Regardless of the type, quality assessment practices impact student outcomes. Despite the importance of accountability and assessments in education today, not all teachers have received formal training in formative or summative assessment design or analysis (DeLuca & Bellera, 2013; Guskey, 2003; Mertler, 2004). Novice teachers report they are unprepared to assess student learning, as they have low assessment literacy skills despite assessment development efforts within undergraduate programs (Campbell & Evans, 2000; Mertler, 2004). Volante & Fazio (2007) suggest a need for further assessment literacy training at the university level. Professional organizations such as the National Education Association (NEA), the American Federation of Teachers (AFT), the National Council for Accreditation of Teacher Education (NCATE), and the National Board of Professional Teacher Standards (NBPTS) have all agreed that teachers should be a component in assessments (Stiggins, 1999). Brookhart (2011) suggested that though *Standards for Teacher Competence in Educational Assessment of Students* was released in 1990, the standards have become outdated, especially with the standards-based movement.

In 2010, the Illinois General Assembly and the Governor signed and passed PERA (ISBE, 2014). The Illinois State Board of Education developed a rolling

implementation plan, starting with the Race to the Top school districts. All school districts in Illinois will have to implement PERA by the 2015-16 school year. Teachers want to be confident in their classroom assessments, but unfortunately not all states require educators to be competent in assessment literacy (Guskey, 2003). In 1999, Stiggins reported that 25 states had no expectations for assessment competency, only 10 states required coursework during training, and 15 states included assessment competency with teacher certification. Chappuis (2014) suggested that preservice preparation programs focus mostly on how to instruct rather than how to instruct and assess. Furthermore, she made the claim that assessments are typically generated by textbook companies. Assessment design is a challenge and sound design is an obstacle for teachers, especially in light of PERA.

The challenge to learn how to implement assessment design becomes an overwhelming task. The professional development required takes time, which may not be available. Black and Wiliam (1998a) identified three areas of improvement within the formative assessment process: accuracy, descriptive feedback, and student involvement. Stiggins, Arter, Chappuis, Chappuis, and the Educational Testing Service (2006) have identified indicators of sound classroom assessment which include: purpose, clear targets, sound design, effective communication, and sound involvement.

Assessment development includes ensuring that the questions, instructional strategies, and teaching methods have an appropriate level of complexity or cognitive demand (recall, comprehension, application, analysis, synthesis, evaluation, creation) for the content and skills being taught, which can be challenging. Throughout the units of instruction and assessment, the assessment designers need to determine if the questions

are written well, not confusing, or one answer does not answer another question. Attempts need to be made to avoid potential sources of bias and distortion. In addition, educators need to take into account anything in the assessment design or the students' abilities that might inhibit students from demonstrating their learning. A challenge in sound design is that teachers have not had the proper training in assessment development. The assessment method needs to match what the student is expected to demonstrate or know. Depending on whether the students need to demonstrate knowledge mastery, reasoning proficiency, performance skills, or the ability to create products, the teacher needs to select the appropriate assessment method (e.g., selected response, extended written response, performance assessment, personal communication) (Stiggins, Arter, Chappuis, Chappuis, & the Educational Testing Service, 2006).

Formative and Summative Assessment

There is little consensus in the literature on a clear definition, a purpose, or the characteristics of formative assessment (Heritage, 2007; Marzano, 2010a; Popham, 2005; Stiggins, 2002). Popham (2008) has suggested that defining formative assessment is too daunting a task. Early on, Black and Wiliam (2003) suggested that the terms formative and summative did not apply to the *type* of assessment, but rather the *function* of the assessment.

Summative assessments inform the teacher and student about competency in learning; evaluating a student's overall academic performance by providing a final score or grade (Chappuis, 2015; Sadler, 1989). Summative assessments tend to be administered at the end of an instructional cycle, such as a final exam or a culminating project to evaluate the curriculum (Chappuis, 2015; Heritage, 2010; Marzano, 2010b).

Formative assessment (obtrusive or unobtrusive) is the ongoing process of gathering evidence of learning for the purpose of guiding instruction to increase student learning by developing knowledge and skills (Brookhart, 2004; Chappuis, 2015; Heritage, 2010). Obtrusive assessments stop the natural flow of learning; in other words, instruction stops to take an assessment (Marzano, 2010b). When a teacher announces there is a quiz on Thursday, this is a common form of a traditional obtrusive assessment. In contrast, an unobtrusive assessment goes with the flow of learning; sometimes the students do not realize they are being assessed (Marzano, 2010b). Unobtrusive assessments include activities such as graphic organizers, exit slips, journals, self-evaluation, voting cards, four corners, K-W-L, and think-pair-share embedded in the learning process. This type of formative assessment happens whenever the teacher witnesses a student demonstrating what he or she knows or is able to do (Erkens, 2012; Marzano, 2010a)

In 1967, Scriven introduced the terms *summative* and *formative* evaluation and connected the terms to curriculum and teaching. He described a process to measure the quality of curriculum programs using formative and summative evaluation. During the 1960s, Bloom tried to interchange formative and summative evaluation with formative and summative assessment (Dunn & Mulvenon, 2009; Marzano, 2010a; Popham, 2008). According to Marzano (2010a), few educators were interested in applying formative/summative evaluation to assessments. A summative assessment can be used for formative purposes and a formative assessment can be determined a summative assessment (Chappuis, 2015; Erkens, 2012). The difference is in the type of assessment rather than the use of the results. Formative evaluation or assessment is conducted

continually throughout the learning process from the initial assessment to the final assessment; it is a means to support learning (Burke, 1999; Nolen, 2011). Dunn and Mulvenon (2009) suggested rather than defining a test as formative or summative assessment, it is how the assessment is evaluated that determines if it is summative or formative. Formative evaluation is a process to diagnose the problem or gaps in learning then generate solutions or an action plan (Scriven, 1994). Figure 1 indicates the difference between formative evaluation and summative evaluation. In addition, it indicates how the evaluation of the assessment is different, not the type of assessment.

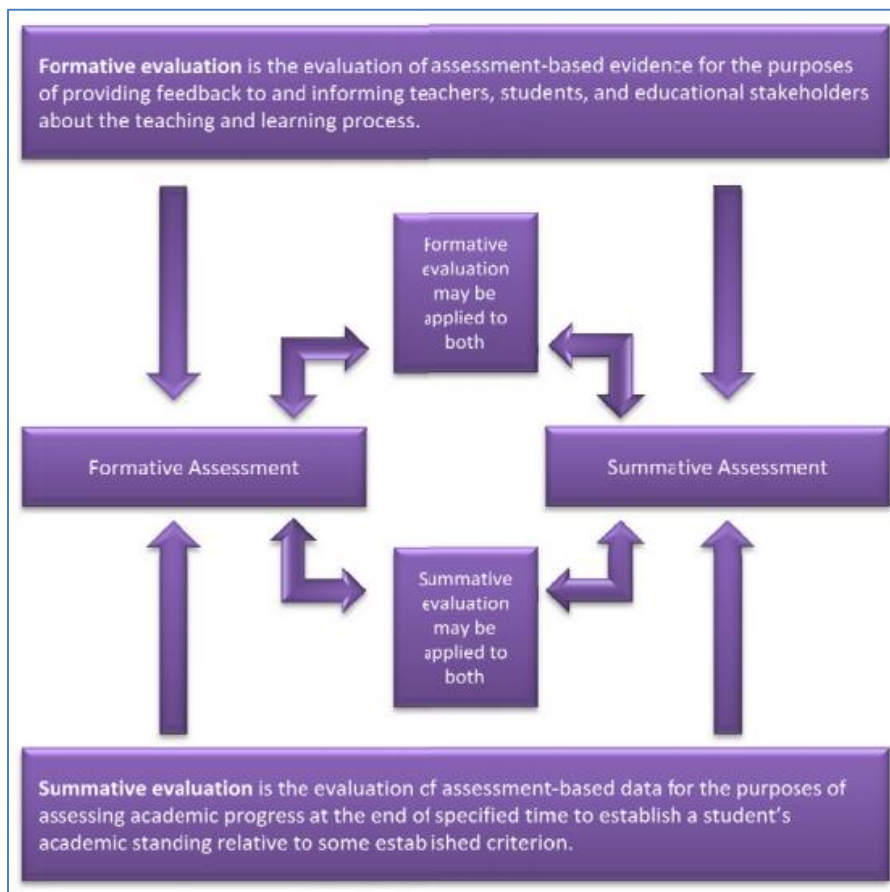


Figure 1. Practical Model of Assessment and Evaluation System. Adapted from Dunn, K. E., & Mulvenon, S. W. (2009). A critical review of research on formative assessments: The limited scientific evidence of the impact of formative assessments in education. Practical Assessment & Research and Evaluation, 14(7), 1-11.

For the purpose of this research, formative evaluation is defined as assessment *for* learning and summative evaluation is defined as assessment *of* learning. Assessment for learning is when evidence of learning is used to inform students and teachers of the teaching and learning process (Chappuis, 2010; Erkens, 2012; Shepard, 2008). It refers to assessment practices where feedback is provided to students as part of the practice, in an effort to improve and accelerate learning (Sadler, 1998). Assessment of learning is when evidence of learning is used to determine a student's academic progress at the end of learning based on a standard or criterion. An analogy is assessment of learning is an autopsy and assessment for learning is a physical exam (Erkens, 2012; Reeves, 2000).

Assessments of learning determine if a student met a certain proficiency level and generally occur at the end of the unit or end of the year (DuFour, DuFour, & Eaker, 2008). Purposes of assessments of learning include measuring the level of achievement on state/provincial content standards, measuring the level of achievement on a learning target, or determining the effectiveness of curriculum or instruction, grading, certifications (Black & Wiliam, 2003; Popham, 2003) or program effectiveness (Chappuis, 2015). Types of summative assessments include state assessments, district benchmark assessments, interim assessments, and common end of unit assessments. In contrast to assessments of learning, which aim to summarize learning at one point in time, assessments for learning involve providing quality feedback focusing on student learning.

The purpose of assessment for learning is to improve teaching and learning; not to finalize the learning with a grade (Burke, 1999). Formative assessments are informal, obtrusive or unobtrusive gathering of evidence of learning (Chappuis, 2015; Stiggins &

Chappuis, 2006), which are then used to inform, enhance, guide, and improve teaching and learning for teachers and students (Black & Wiliam, 2003; Stiggins, 2006; Tomlinson, 2014; Wiliam & Thompson, 2007). This requires a shift not only in instruction, but also in assessment practices from auditing assessments to improving student performance (Black & Wiliam, 2003; Chappuis & Stiggins, 2002; Wiggins, 1998). The assessment process requires teachers to select, modify, and create assessments that match the intended cognitive demand. Bloom (1964) suggested that effective teachers use classroom assessments as a vital learning tool. For the purpose of this research study, the general term assessment represents instruments used to collect academic information. Assessments for learning focus on the assessment tool and strategies to enhance learning aimed at not only instructional practices, but also improving student achievement.

Formative Assessment Process

As early as the 1970s, tools and practices were being developing to support learning (Black & Wiliam, 2003; Nolen, 2011). Assessment for learning has emerged as a series of strategies employed to inform students where they are in the learning process. It is not a particular assessment and it is used for instructional changes (Marzano, 2010a; McKnight, 2014). Assessments (obtrusive or unobtrusive) need to move from interdependent to dependent events or instructional practices that inform learning over time and are instructionally embedded activities that check for understanding and are intended to guide instruction and promote learning (Marzano, 2010b; Reeves, 2007; Stiggins, 2008). Tomlinson (2014) suggested that assessment for learning is a bridge between from one lesson to the next or a sequence of moves that engages the teacher and

students. This engagement locks the teacher and the students in a continuous learning loop (Duckor, 2014). To have an impact on student learning, teachers must leverage each activity to the next activity to make in-the-moment changes to classroom instruction (William & Thompson, 2007). Informal assessments include, but are not limited to, observations, skill checklists, rubrics, portfolio assessment, conferencing, peer review, and self-assessment (Fisher & Frey, 2001). Tools such as rubrics, protocols, templates, samples, and providing productive and descriptive actionable feedback support a consistent, continued, sustainable learning environment.

Formative assessment is a learning process that engages teachers and students during instruction. Included in the learning process is using feedback to adjust ongoing teaching and learning to improve students' achievement of intended outcomes. How students interpret assessment results has an impact on their achievement. Some assessment experts encourage non-grading of formative assessments because students are still in the learning process (Tomlinson, 2014). Assessments need to be accurate and timely evidence of student learning that is understandable both to the students and to the teachers in order to be effective instructional tools that support student learning. Time for teachers to use an assessment formatively in order to adjust teaching and learning becomes a challenge (Black & William, 2005). This process must be built into the learning process. The process forms a picture of the student's emerging academic development (Tomlinson, 2014). A function of assessment for learning is to allow for improvements during learning by increasing the frequency and speed of the feedback along with the number of formative assessments given (Black & William, 2009; Daly, Pachler, Mor, & Mellar, 2010). Popham (2009) identified three positive outcomes for

using formative assessment: formative assessment improves learning, the increased learning is substantial; and teachers can use a variety of techniques to achieve these same results.

However, before teachers can implement effective use of formative assessment, they must understand what formative assessment is and understand that formative assessment is a process (assessment for learning). Hattie (2009) suggested that the collection of continual student academic data during instruction leads to improved academic achievement.

Assessment for Learning

William (2009) identified five key strategies for assessment for learning. He concluded that to exclude any one of these strategies results in a failure to use formative assessment appropriately and effectively. The five strategies include:

- clarifying and understanding intentions and criteria for success;
- engineering effective classroom discussions, questions, and tasks that elicit evidence of learning;
- providing feedback that moves learners forward;
- activating students as instructional resources for each other; and
- activating students as owners of their own learning.

William's main point was that evidence about learning is used to adjust instruction to meet the learner's needs better; in other words, teaching is adaptive to the learner's needs. Similarly, the Assessment Training Institute developed seven strategies of assessment for learning (Chappuis, 2005). The seven strategies of assessment for learning follow three questions: "Where am I going?" "Where am I now?" and "How can I close the gap?"

(Chappuis, 2005). This approach is similar to Wiliam and Thompson's (2007) framework for formative assessment, which is based on Wiliam's five strategies and asks the following three questions from the teachers' perspective: "Where is the learner going?" "Where is the learner right now?" and "How does the learner get there?" (Wiliam, 2007). Figure 2 answers the three questions from the perspective of the teacher, a peer, and the learner.

	Where the learner is going	Where the learner is right now	How to get there
Teacher	Clarifying and sharing learning intentions and criteria for success	Engineering effective classroom discussions, questions, activities, and tasks that elicit evidence of learning	Providing feedback that moves learners forward
Peer	Understanding and sharing learning intentions and criteria for success	Activating students as instructional resources for one another	
Learner	Understanding learning intentions and criteria for success	Activating students as the owners of their own learning	

Figure 2. Aspects of Assessment for Learning. Adapted from Wiliam, D., & Thompson, M. (2006). Integrating assessment with instruction: What will it take to make it work? In C. A. Dwyer (Ed.), The future of assessment: Shaping teaching and learning. Mahwah, NJ: Lawrence Erlbaum Associates.

The first question indicates the final learning destination. When assessments are aligned to intended targets and communicated to students, the assessment results serve as meaningful and purposeful sources of information to students (Reeves, 2007; Tomlinson, 2014). The aligned standard informs the students what they need to know or be able to do by the end of the course (Chappuis, 2005; Erkens, 2012). The standard should be presented in student-friendly terminology (Tomlinson, 2014) and teachers should provide students with examples of clear and understandable standards or learning targets. In addition, teachers will use or incorporate both strong and weak examples of student work

(Chappuis, 2005; Sadler, 1983; Spiller, 2009). The first part, “Where am I going?” includes two strategies that provide students a clear understanding of the learning targets using examples of student work. The instruction design includes formative learning activities to assist students in meeting the targets so that students are able to monitor and adjust their efforts based upon the feedback (Popham, 2003; Wiggins, 1998).

To answer the second question, “Where am I now?” the teacher needs to inform students where they are in the learning process. Think of a map with an icon: “You are here.” It should indicate to the students where they are in the learning process relative to where they started and to where they need to get. Assessment for learning should focus on what students have learned instead of solely on what the teacher has taught (Tankersley, 2007). The answer to this question requires frequent descriptive feedback provided to the students (Chappuis, 2005; Erkens, 2012). During this step in the learning process, students are able to set learning goals through feedback and self-assessment (Hattie & Timperley, 2007). Hattie and Timperly (2007) determined that self-regulated learners are cognizant of their academic strengths and weaknesses. Simply put, students can detect their own errors and implement strategies to correct their misconceptions and, therefore, can attribute their academic successes and failures to factors within their control. They have an identified list of strategies to tackle the learning process while maintaining a growth mindset. In addition, the students understand the effort they need to exert to take on challenges, practice their learning, and understand material at deeper levels that will lead to higher academic success.

Once students understand where they are in the learning process compared to where they need to be, an action plan can be developed addressing how the gap will be

closed. Wilhelm (2013) suggested that teachers should not close the gap for learners by doing all the thinking, but instead support the learners to close the gap for themselves. During this part of the learning process, the teacher designs lessons focused on an identified learning target, teaching students how to revise, and engaging students in the process of reflection and progress monitoring (Stiggins et al., 2006). To monitor their own learning, students engage in self-reflection while tracking and sharing their learning (Chappuis, 2005). Each of these strategies takes time to develop. If classroom teachers are going to shift from testing students to assessing students, then a foundation must be formed on effective instructional practices aimed at student learning (Driscoll, 2001).

The benefit of formative assessment to students is the awareness and monitoring of learning progress. On a consistent basis, assessments for learning (informal or formal) should be at the core of teaching and learning (Chappuis, 2014; Tomlinson, 2014). The students receive regular and timely feedback on what they need to do to attain the required standards. It is not enough simply to look at assessment results; in order to benefit students, assessments must be followed with both corrective and enhancing instruction as well as multiple opportunities for students to demonstrate learning (Reeves, 2007). Black and Wiliam's (1998b) synthesis described three key factors to maximize gains in student achievement: (a) accuracy of classroom assessment, (b) descriptive (not judgmental) feedback, and (c) student involvement in the assessment process. Impact on student achievement is based on the quality of feedback (Reeves, 2007). Shute (2008) suggested that though there is a large body of research on feedback, there has been no consistency in the findings.

Feedback

Many studies have suggested implementing assessment for learning and specifically feedback has had a significant impact on learning (Black & Wiliam, 1998b; Bloom, 1984; Hattie & Timperley, 2007; Meisels et al., 2003; Rodriquez, 2004). Feedback can be applied to both assessment for and assessment of learning (Langer, 2011). When the descriptive feedback is aligned to the intended learning targets, it informs the students where they are and what they need to do next. Research evidence suggests that formative assessment has a greater impact on student achievement than reduction in class size (Wiliam & Thompson, 2007), cognitive ability, or demographics, including socioeconomic background (Hattie & Timperley, 2007). Feedback can have multiple purposes and descriptions (Price, Handley, Millar, & O'Donovan, 2010) and can be provided by a teacher, peer, parent, or self on a student's learning (Hattie & Timperley, 2007). Feedback plays a supportive role in student learning and motivation and assists in students becoming confident learners (Nolen, 2011; Stiggins, 2002) by reducing misconceptions in learning (Hattie & Timperley, 2007). Feedback becomes powerful when it results in students thinking about how to improve their academic status (Tomlinson, 2014).

Historically, teacher feedback has served a social or managerial function. When students feel good about the feedback provided they are more likely to receive it and act on it (Feys, Anseel, & Wille, 2011). A notable shift in feedback occurred as teachers began providing information to students on their current levels of achievement in comparison to the expected levels of achievement, in addition to informing instruction (Black & Wiliam, 2005; Tovani, 2011). Though feedback is noted for having a powerful

impact on learning, the impact is not always positive (Hattie & Timperley, 2007).

Research has indicated that a third of the time, feedback has a negative effect (Kluger & DeNisi, 1996). Butler (1988) found the level of student achievement was associated with the type of feedback provided to the student. The study examined the impact of four different types of feedback: comments, grades, praise, and no feedback. The population of the study included 50 fifth- and sixth-grade Jewish Israeli students. The study found that feedback comments yielded a higher impact on achievement than grades, praise, or no feedback. When only marks or grades were given, there was no increase in student achievement. Furthermore, when marks, grades, and comments were used in combination, student achievement still did not increase. Students ignored the remarks when also given a grade which can result in a negative effect on student achievement (Black, Harrison, Marshall, & Wiliam, 2004). However, when only feedback comments were provided, there was at least a 30% increase in achievement (Butler, 1988). Providing and receiving feedback is a skill both teachers and students need to understand for it to be impactful (Hattie & Timperley, 2007).

Attributes of Feedback

If feedback is the cornerstone of impacting student achievement, then it is necessary to develop an understanding of how to provide effective feedback. Teachers have focused on correctional feedback (right/wrong) rather than instructional feedback (Hattie & Timperley, 2007). Sadler (1989) established three conditions for effective feedback. The first condition requires students to understand how to monitor their own learning during the learning process (Spiller, 2009; Tomlinson, 2014). Not all students know how to use feedback effectively (Brookhart, 2008). The next condition is that

students are able to evaluate and compare their own work to exemplar work. The last condition is that all students must have the skills necessary to make improvements. Rather than providing feedback, teachers should be feeding up and feeding forward: teachers can comment on the current learning while informing students on where they are going (Gibbs & Simpson, 2004). Feeding up is establishing and articulating a clear purpose or learning goal (Fisher & Frey, 2009). Feeding forward happens when the teacher uses assessment data to modify instruction (Fisher & Frey, 2009). Feeding forward need not only concern the actions of the teacher; it could also include what the students are able to do with the information. Within the feedback process, students receive feedback with the expectation they will engage with the feedback by reading it, reflecting on it, and using it for the next step in the learning process. Using the feedback for the next assessment is feeding forward; however, the absence of identified areas of improvement or descriptive feedback comments related to learning targets makes it difficult for students to use the information to feed forward on future assignments or assessments (Duncan, 2007; Quinton & Smallbone, 2010).

Feedback should be clear, purposeful, and meaningful and should connect the students from where their learning began on the standard to where they need to end (Chappuis, 2010; Erkens, 2012; Hattie & Timperley, 2007). Therefore, feedback should be explicitly connected to the learning and the assessment criteria (Erkens, 2012; Spiller, 2009). The following practices have been cited in the literature:

- feedback describes the learning in terms of the established targets or standards. The feedback does not quantify or evaluate the learning (Chappuis, 2005; Erkens, 2012; Kluger & DeNisi, 1996; Stiggins, 2002; Williams, 2009);

- the knowledge and skills are scaffolded: the feedback provides the next steps for specific action (Butler, 1988; Marzano, Pickering, & Pollock, 2005; Williams, 2009);
- explicit evidence-based information is provided to the students about learning: the feedback provides both success and intervention qualifiers (Marzano et al., 2005);
- a feedback loop is encouraged: the feedback continues the learning and does not do the thinking for the learner (Duncan, 2007; Hattie & Timperley, 2007);
- opportunities are provided and articulated throughout the learning intended to close the gap between the current and desired academic performance (Erkens, 2012);
- the feedback should challenge students assumptions about their learning and think critically (Black et al., 2004)
- the feedback is focused, manageable, and timely (Kulhavy, 1977); and
- information to teachers is used to guide instructional practices (Black & William, 1998a; Erkens, 2012; Heritage, 2007; Marzano, 2007; Stiggins, 2002).

Similar to the three questions developed by the Assessment Training Institute in the *Seven Strategies for Formative Assessment*, Hattie and Timperley (2007) suggested that effective feedback answers the following three questions: “Where am I going?” “How am I going?” and “Where to next?” These three questions are not meant to be linear; they act as a guide to close the gap in learning. They inform students of the intended learning goals, the progress made towards the learning goals, and the activities needed to make increased progress toward the learning goals. Hattie and Timperley (2007) suggested

feedback should feed up, feed back, and feed forward. The three parts form a feedback system that gives power to teachers and students to address gaps and gains in learning in the learning moment (Fisher & Frey, 2009). Feed up informs the students what they are going to be learning about: it means clearly identifying learning targets and articulating them to students. Feed forward informs the students what is going to happen next: teachers use assessment (informal or formal) data to modify instruction. Informing the students how they are doing happens during the feed back stage. It is the response to the students on their work and is directly related to the learning goals and targets (Fisher & Frey, 2009). Figure 3 indicates not only the purpose of feedback, but also how feedback can be used to clarify discrepancies in understanding. The three parts of the system work together so that students can use the information provided by the teacher to improve their academic performance and master the learning target (Brookhart, 2008; Fisher & Frey, 2009).

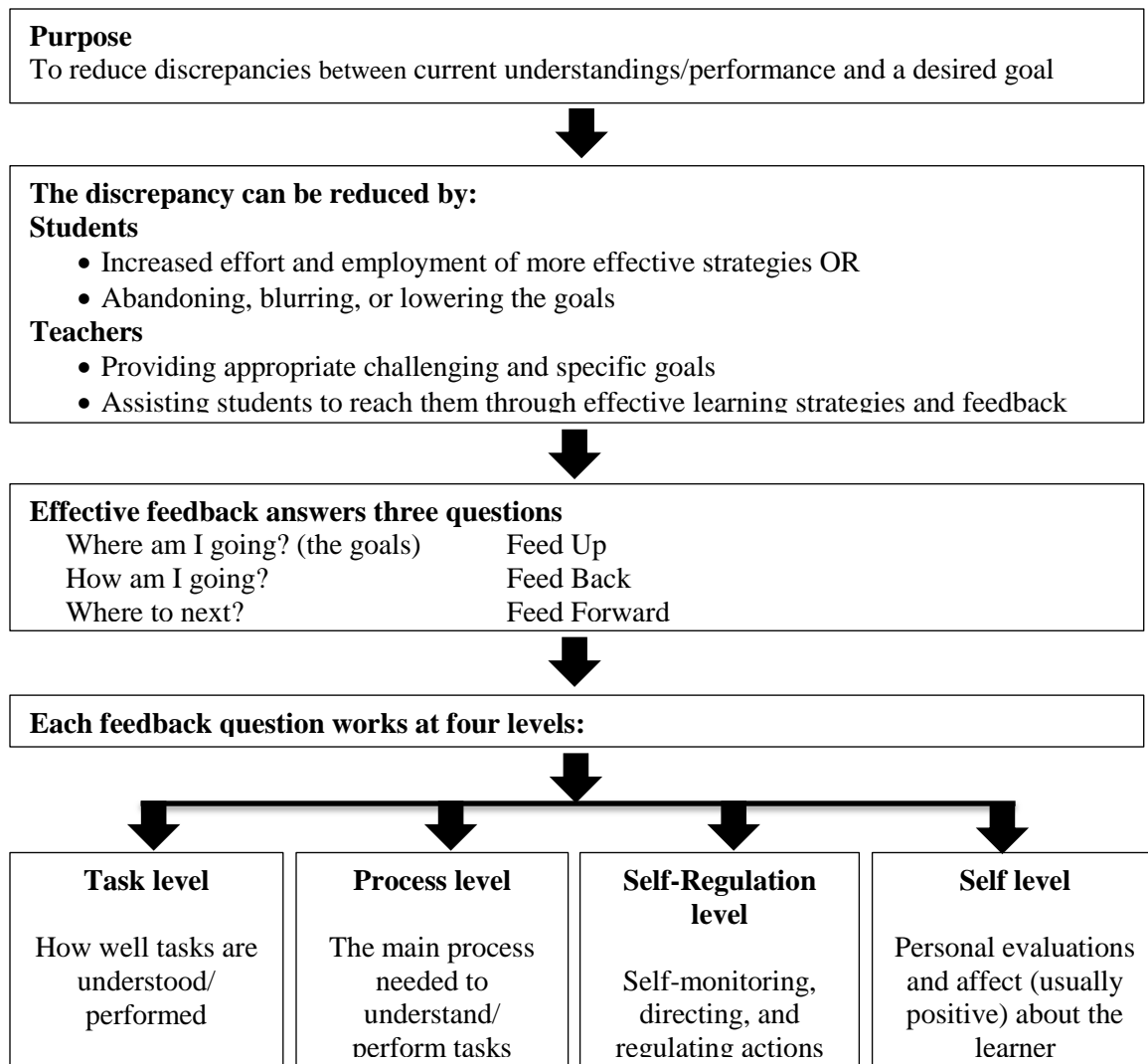


Figure 3. A Model of Feedback to Enhance Learning. Adapted from Hattie, J., & Timperley, H. (2007). The power of feedback. Review of Educational Research, 77(1), 81-112.

The four levels of feedback Hattie and Timperley (2007) established are task, process, self-regulation, and self. The most effective of the four are process and self-regulation, while the two types most used are task and self (Hattie & Timperley, 2007). In the feedback process, students learn both what they have correctly understood and where they have misconceptions. In addition, students are provided the strategies or directions to improve their understanding of the standards. It is even more impactful

when both students and teachers seek the answers to the questions (Hattie & Timperley, 2007).

According to Jordan (2011) the instantaneous receipt of feedback was the most commonly identified useful feature of computerized assessments. A challenge of formative assessments is the ability to give accurate and timely feedback. Feedback should be linked back to the clear learning targets established at the beginning of the lesson (Tomlinson, 2014), with the intent of making it actionable (Chappuis, 2014). According to Chappuis (2015), feedback can be identified as success feedback or intervention feedback. Success feedback informs students what was correctly completed. Intervention feedback informs students what areas need improvement and provides information to correct their misconceptions. More specifically, the feedback makes specific suggestions, asks students a question leading to a course of action, or provides a reminder (Erkens, 2012). As a result, feedback assists in improving the learning while it is occurring (Heritage, 2010).

Feedback supporting learning is most effective when it occurs and evolves during the learning process and is descriptive enough for the students to know what is expected of them to make gains in their learning. Brookhart (2008) summarized several feedback strategies as shown in Table 2.

Table 2

Feedback Strategies

Feedback strategies can vary in...	In These Ways...	Recommendations for Good Feedback
Timing	<ul style="list-style-type: none"> • When given • How often 	<ul style="list-style-type: none"> • Provide immediate feedback for knowledge of facts (right/wrong). • Delay feedback slightly for more comprehensive reviews of student thinking and processing. • Never delay feedback beyond when it would make a difference to students. • Provide feedback as often as is practical, for all major assignments.
Amount	<ul style="list-style-type: none"> • How many points made • How much about each point 	<ul style="list-style-type: none"> • Prioritize-pick the most important points. • Choose points that relate to major learning goals. • Consider the student's developmental level.
Mode	<ul style="list-style-type: none"> • Oral • Written • Visual/demonstration 	<ul style="list-style-type: none"> • Select the best mode for the message. Would a comment in passing the student's desk suffice? Is a conference needed? • Interactive feedback (talking with the student) is best when possible. • Give written feedback on written work or on assignment cover sheets. • Use demonstration if "how to do something" is an issue or if the student needs an example.
Audience	<ul style="list-style-type: none"> • Individual • Group/class 	<ul style="list-style-type: none"> • Individual feedback says, "The teacher values my learning." • Group/class feedback works if most of the class missed the same concept on an assignment, which presents an opportunity for reteaching.

Adapted from Brookhart, S. M. (2008). *How to give effective feedback to your students*. Alexandria, VA: Association for Supervision and Curriculum Development.

Feedback should be instructive not personal. Providing comments such as "nice job" or "great work," which focus on the quantity or length of a project or the presentation itself does not help learners to understand what to improve in relation to

their learning (Hattie & Timperley, 2007; Spiller, 2009; Tomlinson, 2014). Simply praising students has little impact on student achievement. No praise provided to students has a greater impact on student achievement than providing praise at all (Kluger & DeNisis, 1998). Butler (1988) found that low achievers' increase in academic performance was higher than high achievers when praise was provided. Praise, rewards, or punishment rarely answer the three questions Hattie and Timperley (2007) suggested lead to effective feedback, therefore having little impact on student achievement.

Assessments are formative when the feedback provides a clear picture to students of their progress and results in learners making the necessary changes to adopt the new understanding as the teacher modifies the learning task for the learner (Daly et al., 2010; Marzano, 2010b). In addition, opportunities for further learning must be available for students to act on the feedback (Tovani, 2014a) to close any gaps between current and desired student outcomes (Spiller, 2009). This requires some level of planning by the teacher prior to the lesson (Chappuis, 2014). An effective practice of formative assessments is to increase the frequency and speed at which the feedback is provided to students (Black & Wiliam, 2009; Daly et al., 2010). The feedback provided to students should be both timely and descriptive, not just an indication of right and wrong answers.

Feedback Loop

In the learning process, feedback happens after initial learning (Hattie & Timperley, 2007). Spiller (2009) suggested that the whole learning process should involve conversations focusing on assessment and feedback with active participation by both the teacher and the students. Continuous feedback keeps the learning moving (Hattie, 2009). In contrast, Kulhavy, White, Topp, Chan, and Adams (1985) argued that

there is no direct connection between the amount of feedback and increased learning. In other words, the level or amount of feedback provided does not equate to increased student achievement. Teacher feedback to students does not always increase student achievement (Nolen, 2011). Feedback is a two-way, ongoing conversation (Hattie & Timperley, 2007; Tomlinson, 2014; Vatterott, 2014). Price, Handley, Millar, and O'Donovan (2010) suggested that feedback effectiveness is dependent on the relationship between the student and the teacher (Black & Wiliam, 1998a; Heen & Stone, 2014). If students do not read the feedback (Hounsell, 1987), they will not act on it (Gibbs & Simpson, 2004); acting on the feedback is a choice (Price et al., 2010). Duncan (2007) stated that it is commonly reported that students do not read feedback. Students need to understand the direct benefits of feedback (Spiller, 2009) and learners have to understand the feedback provided (Duncan, 2007; Price et al., 2010). Students must understand the connection between the feedback given and academic attainment. If the connection is not made, the feedback during the communication loop or feedback loop fails (Sadler, 2010). In other words, when feedback is too complex and not directed toward the learning goal or standard, feedback cannot lead to clearing misconceptions (Hattie & Timperley, 2007). Developing an effective feedback loop is complex. Though the learner is in a position to receive the feedback, he or she does not always understand it or see the benefit of the feedback provided (Heen & Stone, 2014; Price et al., 2010). Feedback is not a one size fits all model, students can interpret the same feedback in different ways (Hattie & Jaeger, 1998). In addition, assessment feedback can be received and heard differently when the feedback is provided publically or privately (Nolen, 2011). Kluger & Denisi (1996) suggested four ways students handle feedback: increase effort, give-up or abandon

the learning, reduce or change the expectation, or reject the feedback comments.

Learning occurs throughout the school year with feedback provided to students for different purposes and provided at varying levels of support. Feedback and learning are dependent on each other (Hattie & Timperley, 2007). Sadler (1989) argued that the power of feedback is helping students meet the end goal or attain the identified standard through answering “Where am I going?” Students need the time to make sense of the feedback provided (Hattie & Timperley, 2007). The conversational process of a feedback loop translates to a greater sharing of learning between the student and the teacher (Spiller, 2009).

Typology of Feedback

Feedback takes on various forms and goes beyond putting a number or letter grade on an assessment, a final judgment of student work, to rich descriptions of student performance related to the standards (Stiggins, 2008). Reeves (2007) suggested that feedback can be divided into descriptive and evaluative. Studies have indicated eight commonly used levels of feedback ranging from no feedback, to giving students the location of the answer, to identifying specific errors, and at times including explanations of both correct and incorrect answers (Gilman, 1969; Kulhavy & Stock, 1989; Mason & Bruning, 2001; Merrill, 1987). Butler’s types of feedback include comments, grades, praise, and no feedback. Hattie and Timperley (2007) divided types of feedback into levels of feedback: task, process, self-regulation, and self. Erkens (2012) expanded on that to include personal, task or product, process, and self-assessment. Personal feedback is the farthest from connecting the learning to the performance of learner and, in this case, typically praise is provided to the student. Task or product feedback addresses the

correctness or incorrectness of a response. As mentioned previously, this type of feedback has moderate effects on student learning and is most effective when the feedback provided is both simple and specific. Process feedback engages students in the feedback loop and invites learners to revisit specific aspects of their work. The comments are connected directly to the learning goal. The final type, self-assessment, requires learners to assess their work and make plans on how to improve their learning. Nyquist (2003) completed a meta-analysis of 185 studies that were reviewed and resulted in a typology of formative assessment feedback. The typology selected focused on the level of the feedback.

The first level is *weaker feedback only*. The students are simply given a grade or score. In this case, students might see this as a signal that the learning is over (Erkens, 2012). A traditional function of feedback is to correct (Price et al., 2010). Feedback in the form of a grade does not indicate or communicate to students how to improve their learning (Brookhart, 2008; Guskey, 2003; Vatterott, 2009). In reviewing six studies, Bangert-Drowns, Kulik, Kulik, and Morgan (1991) found that there was a three percent loss in student achievement when only the right or wrong answer was provided to the students. In 30 studies there was an eight and a half percent gain in student achievement when only the correct answers were provided. Assigning a low grade can be viewed by the learner as punishment (Chappuis, 2014). Butler (1987) showed that when students are only provided a grade, their level of involvement is impacted, not necessarily their academic performance. However, Butler's study did indicate that student achievement increased more for high achievers than low achievers when receiving grades only.

The next level is *feedback only*. At this level, students are provided not only a grade or scores, but also clear statements of corrective knowledge to improve their answers. Providing marks and grades with comments has a negative effect on student learning. The students tend to look at the score and ignore the comments (Black, 2004; Butler, 1988). Brookhart (2008) suggested that students will review the comment as to why they received the grade. Erkens (2012) expressed the notion that the grade informs the student that learning is complete and that students will tend not to look at the comments provided on the assignment. Another point of view is that when feedback provided to the student is too specific, it does not lead to future learning (Hattie & Timperley, 2007). The statements do not build on one another and students find they do not need to think for themselves about what needs to be corrected (William, 2011).

The third level is *weak formative assessment*. Students are given both information about the correct response and some explanation. Marzano (2010a) suggested that when either an explanation was provided or the students were reassessed until they provided the correct answer, there was a 20 percent gain in student achievement. Feedback should allow the learner to identify the errors or misconceptions in learning, but it should also guide the learner on where the problems or inconsistencies have occurred during the learning (Sadler, 1989).

The *moderate formative assessment* includes the information defined in the *weak formative assessment* and suggestions for improvement. Feedback constructed in a way that encourages the students while providing information on how to improve along with including strategies is critical (Nolen, 2011). Providing information on how to improve creates a process for new learning (Kulhavy, 1977). Bangert-Drowns et al. (1991)

suggested that effects on learning are more profound when feedback encourages further learning activities, in contrast to giving students only current achievement levels, and that this produces moderate impact on student learning. It is the descriptive feedback on the interpretation of learning, not the grades that make a difference (Hattie & Timperley, 2007). Students sometimes see grades as a way to compare themselves to other students academically, whereas students see comments as a way to improve (Black et al., 2004).

The final level is *strong formative assessment*, which includes everything stated previously and students being assigned specific activities to improve student understanding of the concepts. Success feedback identifies what is done correctly or confirms learning, describes a feature of quality that is present in the work, and points out effective use of a strategy or process (Chappius, 2009). Winnie and Buttler (1994) suggested that successful feedback adds to learning and restructures information accurately. The strong formative assessment mirrors intervention feedback, which can identify a correction, describe the quality of the work, clearly state effective or ineffective steps or procedures, ask students questions about their work, or make a suggestion on what to do next. Intervention feedback identifies where students need to improve their comprehension and informs them of next steps in the learning process (Chappius, 2009). This idea is similar to Hattie and Timperly's (2007) feedback categories, which include task, process, self-regulation, and personal feedback. All types are intended to tell students where they need to be and how they will get there. The meta-analysis conducted on the effectiveness of different types of feedback by Hattie and Timperly found that the least effective type of feedback is when the student conducts a personal evaluation, which is the self-level. Simple task-level feedback was found more effective than complex task-

level feedback. For example, in a study by Kulhavy et al. (1985), students were provided reading passages with multiple-choice answers. Providing students more information about the wrong answer confounded the learning and at times the learner remembered more about the wrong answer than the correct answer. Furthermore, less complex responses to the assessment results resulted in higher levels of attainment. The authors also found that students' confidence in their own learning impacted on the information they received.

Implications of Formative Assessments on Attainment of Standards

Assessments for learning are the link between summative assessments. They allow for the measurement of student growth over time and between assessments. Reviewing assessment data provides teachers the opportunity to determine if the questions test what they intended them to test or determine specific learning targets that still need to be covered. Understanding the standards and implementing the effective practices of formative assessments promotes student learning. Research has shown that formative assessments help support student achievement (Black & Wiliam, 1998b), though feedback given is the most impactful part of this process (Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Meisels et al., 2003; Nolen, 2011; Rodriquez, 2004; Stiggins, 2002). The power of feedback supporting learning occurs when it evolves during the learning process and is descriptive enough that the students know what is expected of them to make gains in their learning (Stiggins et al., 2006).

The gap in research is which type of feedback impacts student learning most effectively. In other words, what type of feedback will best assist teachers in maximizing student learning through both the attainment of and growth in standards, in light of the

implementation of Common Core Standards and PERA laws? In 2003, Black and Wiliam suggested that teachers were formulating the value of formative assessment practices as their own professional practices. The implementation of PERA has started this snowball effect once again. Langer (2011) suggested that results from studies on feedback have been contradictory due to low effect size, population size, or sample size. To answer the question of what makes good feedback, Black and Wiliam (2003) suggested anything that resulted in the students thinking. The research has indicated various strategies that have proved to be effective; however, the teachers who are engaging in a feedback process or loop are doing it without knowing what is making the greatest impact (Langer, 2011; Shute, 2008). Black and Wiliam (2003) suggested that there was enough evidence in research that raising standards of achievement is directly linked to improving the quality of formative assessments. This study aims to explore whether or not differences exist in the level of use of formative assessment strategies with an emphasis on type of feedback by English and mathematics teachers.

Summary

Assessments serve as accountability measures for the school system, the teacher, and the student. The cornerstone of school improvement is effective implementation of assessment of learning and assessment for learning. Determining common definitions for summative and formative assessment has been a challenge. In the 1960s, there was a shift from formative and summative evaluation to summative and formative assessment. The difference is in the type of assessment rather than the use of the results.

Formative or summative evaluation can be applied to any type of assessment. Summative evaluation focuses on attainment at the end of learning, while formative

evaluation focuses on attainment during the learning. To complete the formative assessment process, the collaboration among teachers includes engineering effective classroom discussions, questions, and tasks that elicit evidence of learning explicitly linked to the standards, providing feedback that moves learners forward, activating students as instructional resources for each other, and activating students as owners of their own learning.

This review of literature has indicated not only that there is a link between the effective use of assessment for learning and improved student achievement, but also that feedback is an integral part of assessment practices and increasing students' academic achievement. More specifically, research has shown that using specific assessment strategies that provide students clear feedback is a powerful tool to accelerate learning. Additional research is needed to measure the effectiveness of assessment for learning strategies and their impact on learning. My research is designed to examine whether or not differences exist in the level of use of formative assessment strategies by English and mathematics teachers.

CHAPTER III

RESEARCH METHODOLOGY

The purpose of feedback is to provide students with specific information about their learning process and to project both the students' educational goals for the standards and how they can accomplish those goals. Wiliam (2001) suggests only some students will benefit from being provided feedback on academic achievement and moving on with the next curriculum without the expectation of acting on the feedback. When the student acts on the feedback given to them by engaging with the teacher's comments, then the impact on student achievement is profound. Given that formative assessment strategies and feedback have the potential to increase student achievement (Black and Wiliam, 1998a; Wiliam, Lee, Harrison & Black, 2004), this research study investigated the levels of use of formative assessment strategies in high school English and mathematics courses. The goal of the research was to determine whether the levels of use of formative assessment strategies vary by:

- content area taught (English vs. mathematics),
- course type within content area (accelerated courses vs. developmental courses),
- number of different courses taught,
- teacher's perceptions of their knowledge of these practices, and other teacher demographics (e.g., gender, years of experience, degrees/ qualifications).

As the basis for a conceptual framework, this study employed the seven strategies of assessment for learning developed by the Assessment Training Institute. As articulated by Chappuis (2015), the seven strategies provide direction for effective research-based practices on the use of classroom assessments. A non-experimental, quantitative survey approach was used to test the hypothesis and answer the research questions. Within this chapter elements of the research design and methodology are identified and described as it relates to this quantitative study.

Research Questions

This study examined the levels of use of formative assessment strategies specifically the types of feedback provided by English and mathematics teachers. The research questions that guided this study were:

1. What are the levels of use of formative assessment practices for high school English and math teachers?
 - a) Do the levels of use of formative assessment practices vary by content area taught (i.e., English teachers vs. math teachers)?
 - b) Do the levels of use formative assessment practices vary by course type within subject area (i.e., accelerated courses vs. developmental courses)
 - c) Do the levels of use formative assessment practices vary by the number of different courses taught?
 - d) Do the levels of use formative assessment practices vary by teacher's perceptions of their knowledge of these practices?
 - e) Do the levels of use formative assessment practices vary by gender?

- f) Do the levels of use formative assessment practices vary by years of teaching experience?
- g) Do the levels of use formative assessment practices vary by teacher degrees/ qualifications?
- h) Do the levels of use formative assessment practices vary by participation in professional learning activities?

There are 8 null and research hypotheses derived from the research question. These hypotheses attempted to explore the differences between various nominal independent variables and the level of use of formative assessment strategies.

Null Hypothesis 1

H_{01} = There is no difference between the levels of use of formative assessment strategies by English teachers and by mathematics teachers.

Research Hypothesis 1

H_1 = There is a difference between the levels of use of formative assessment strategies by English teachers and by mathematics teachers.

Null Hypothesis 2

H_{02} = There is no difference in the levels of use of formative assessment strategies used among development courses, average level courses, and accelerated courses by English and mathematics teachers.

Research Hypothesis 2

H_2 = There is a difference in the levels of use of formative assessment strategies used among development courses, average level courses, and accelerated courses by English and mathematics teachers.

Null Hypothesis 3

H_{03} = There is no difference in the level of use of formative assessment practices based on the number of different courses by English and mathematics teachers.

Research Hypothesis 3

H_3 = There is a difference in the level of use of formative assessment practices based on the number of different courses by English and mathematics teachers.

Null Hypothesis 4

H_{04} = There is no difference in the level of use of formative assessment practices based on teacher's perceptions of their knowledge of these practices.

Research Hypothesis 4

H_4 = There is a difference in the level of use of formative assessment practices based on teacher's perceptions of their knowledge of these practices.

Null Hypothesis 5

H_{05} = There is no difference in the level of use of formative assessment practices based on teacher's gender.

Research Hypothesis 5

H_5 = There is a difference in the level of use of formative assessment practices based on teacher's gender.

Null Hypothesis 6

H_{06} = There is no difference in the level of use of formative assessment practices based on years of teaching experience.

Research Hypothesis 6

H₆ = There is a difference in the level of use of formative assessment practices based on years of teaching experience.

Null Hypothesis 7

H₀₇ = There is no difference in the level of use of formative assessment practices based on teacher qualifications.

Research Hypothesis 7

H₇ = There is a difference in the level of use of formative assessment practices based on teacher qualifications.

Null Hypothesis 8

H₀₈ = There is no difference in the level of use of formative assessment practices based on professional learning opportunities.

Research Hypothesis 8

H₈ = There is a difference in the level of use of formative assessment practices based on professional learning opportunities.

Research Design

In quantitative designs, the researcher selects from experimental, quasi-experimental, correlational, or descriptive design (Creswell, 2014). This research study is a non-experimental, survey design to determine if differences exist on the levels of use of formative assessment strategies. The purpose of this study was to obtain valid and reliable information for school administrators and teachers to make informed decisions on formative assessments and the impact student learning.

As a researcher, I examined the strength of the relationship without making determinations or implying a cause-and-effect relationship. Johnson (2001) suggests

non-experimental research is important because the variables are not manipulated. I selected a quantitative, non-experimental survey research design because I did not manipulate the independent variable. Non-experimental research lacks manipulation of the independent variable by the researcher; the researcher studies what naturally occurs or has already occurred; and the researcher studies how variables are related (Johnson, 2001).

For the purpose of the research, I selected the courses that the Illinois State Board of Education selected to complete the PARCC assessment in 2014-15 at the secondary level. This included courses aligned to English language arts 3 and Algebra II (ISBE, 2014). The English and mathematics courses are separated into three levels, developmental, average, and accelerated, based on rigor of the course. Students are placed in the levels as incoming freshmen based on their EXPLORE (an ACT Inc. assessment product) scores. Students can move between levels based on academic performance.

The purpose of this non-experimental, survey study is to inform educators on the levels of use of formative assessment strategies specifically the types of feedback provided by English and mathematics teachers. Chappuis (2009) suggests that the majority of gains in student achievement, from use of formative assessments, were made by lower achieving students. This survey analysis enhances the ability of educators to make informed decisions about formative assessment strategies and the impact of professional development.

Research Setting

This study was conducted at a large high school district located in the northwest suburbs of Chicago, Illinois. The population consists of 12,164 students and 900 teachers within five high schools. For the purpose of the study the high schools will be referred to as Schools A, B, C, D, and E. The student population in the district exhibits some level of diversity with 45% minority students (Table 3). Gender representation was roughly equal (52% male and 48% female). Students are equally distributed across grade levels with 25% of students in each grade, 9th, 10th, 11th, and 12th. The high school district serves over 250,000 culturally diverse residents from eleven different villages and towns. Each of the five large high schools serves between 1,900 and 3,000 students. In addition, the district also has two alternative high schools, each serving approximately 40 special needs students. The schools are nationally recognized by the U. S. Department of Education as Blue Ribbon Schools of Excellence.

Table 3

NCLB Subgroup Percentages in the Suburban High School District

School	Enrollment	% White	% Black	% Hispanic	% Asian	% Multi-racial	% Individualized Education Plan	% Economically Disadvantaged
A	2,754	50.0	6.0	34.0	9.0	1.0	13.0	44.0
B	2,793	67.8	3.2	7.1	19.7	2.0	8.2	11.9
C	2,398	58.2	4.5	12.0	22.7	2.2	10.5	21.4
D	2,458	58.3	7.3	18.3	13.4	2.6	12.2	29.4
E	1,959	38.7	13.8	26.4	18.3	2.6	13.1	42.7

School	Enrollment	% White	% Black	% Hispanic	% Asian	% Multi-racial	% Individualized Education Plan	% Economically Disadvantaged
District	12,362	55.4	6.6	19.3	16.3	2.1	29.3	11.3

Source: 2013 Illinois School Report Cards

Each of the schools is located on a 40- to 60- acre site, with an athletic stadium featuring artificial turf and a running track; football, baseball, soccer and softball fields; swimming pool, tennis courts; and multiple gymnasiums. Each high school also has an auditorium; music practice rooms; reading, science, and vocational laboratories, plus an extensive Wi-Fi network, accessible from anywhere on campus.

A comprehensive curriculum, offering more than 270 courses for students and one of the state's largest summer school programs consisting of two, three-week sessions. There are nearly 1,000 certified staff members, with more than 87% of them holding master's degrees or beyond. The teachers have various years of teaching experience, which could impact results: 21% of the teachers have zero to five years of experience, 27% have six to 10 years of experience, 22% have 11 to 15 years of experience and 30% have more than 15 years of experience (ISBE, 2013). All teachers in the school district are considered highly qualified based on Illinois State Board of Education guidelines. Since the 2000-01 school year, more than 130 teachers in the district have earned National Board Certification from the National Board for Professional Teaching Standards.

The high school district subscribes to the Charlotte Danielson framework for teaching for their teacher evaluation system. The framework consists of four domains: (1) planning and preparation, (2) classroom environment, (3) professional responsibilities, and (4) instruction (Danielson, 2007). The evaluation process includes a student academic

growth component which the district will be piloting for the 2014-15 school year to meet the requirements for the Performance Evaluation Reform Act (ISBE, 2014).

Study Sample

Teachers were selected from high schools located in the northwest suburbs of Chicago, Illinois based on content areas and courses they teach. Survey data captured the specific demographic data for the sample population. Teacher participants were contacted via email to solicit participate in the study; informed consent forms were included in the email communication. In the case of this study, a convenience sample was selected because the groups are formed naturally by the course content they teach (Creswell, 2014). The teachers invited to participate, included ninth through twelfth grade English and mathematics teachers who have, on average, 13.6 years of teaching experience. There is always a chance the sample size will not mirror the larger population (Fowler, 2009). In this case, the predicted demographics of the sample reflect the population

With a population of 150, a confidence level of 0.95, and a confidence interval of ± 0.03 , a sample size would be 132. A confidence interval of ± 0.05 resulted in a sample size of 108. With a population of 150, a confidence level of 0.99, and a confidence interval of ± 0.03 , would result in a sample size of 139. A confidence interval of ± 0.05 would result in a sample size of 122.

Accessibility to Data Collection

The study utilized two sources of data to address the research questions: public educational records and an online teacher survey. The Illinois School Report Card data for each school was used to describe the school district. The report card contains detailed

information on the schools within the district being studied. Illinois School Report Cards are available online to the public and is accessible through the district website. The second source of data came from the online teacher survey. The online teacher survey captured demographic information and reports of their individual level of implementation of formative assessment strategies. This survey collected information regarding the subject/discipline taught, type of feedback employed, teacher qualifications, and years of teaching. The survey was administered to participants using an online survey tool (*Select Survey*). As a researcher, I work in the same district as the teacher participants, therefore the participants were accessible.

Value of Specific Methodology

There are three research approaches: 1) qualitative, 2) quantitative, and 3) mixed methods (Creswell, 2014). In a qualitative approach, the researcher has a constructivist or transformative worldview. In other words, the researcher aims to establish meaning (constructivist) or examine an issue (transformative). In a quantitative approach, the researcher has a post-positivist worldview testing a theory with clearly identified hypotheses. In mixed methods, the researcher has a pragmatic worldview approach basing inquiry on assumptions and collecting data to draw conclusions (Creswell, 2014). In selecting a research approach the “philosophical assumptions the researcher brings to the study; procedures of inquiry and specific research methods of data collection, analysis and interpretation” assists in determining which approach (Creswell, 2014, p.3). Stating this more succinctly, qualitative research focuses on the use of words and quantitative focuses on numbers.

Quantitative methodology uses a deductive process of the data collected to draw conclusions (Carr, 1994) and objectively test theories (Creswell, 2014). In a quantitative study, the introduction announces the problem statement compared to a qualitative research where the problem statement emerges. A quantitative study allows for a method of using data to evaluate the degree of association or relationship between variables (Creswell, 2014). The research can be conducted on large or small scales. Internet-based tools benefit the researcher due to low marginal cost, the automation of process, and the ability to collect and manage very large samples of data (Scomavacca, Becker, & Barnes, 2004). The data can easily be compiled and summarized in charts and graphs for communication and analysis purposes. Interpretations for a large data set can be summarized to draw generalizations (Nardi, 2003). Another benefit to quantitative studies is that researchers can replicate the procedures and see if they arrive at the same conclusion. Further researcher could replicate the procedures using data from more content areas.

A researcher's own personal experiences can influence their approach choice. As a new researcher and mathematics major, I am more comfortable with a traditional mode of research, quantitative, that follows clearly identified rules and procedures. In the final analysis, however, the decision is not based on my level of comfort, but rather is directed by the nature of the research problem (Creswell, 2005). Furthermore, in non-experimental research, the researcher collects the data without making changes or introducing treatments (Johnson, 2001). My research aims to analyze the levels of use of formative assessment strategies in high school English and mathematics courses.

Instrumentation

Instruments measure variables in a quantitative study (Creswell, 2005). The instrument used in this study was an online teacher survey. Surveys facilitate collection of data from a large number of people and are efficient in terms of time and can always be quantified (Oliver, 1997). A survey instrument produces statistics that are quantitative, numerical descriptions of the populations' responses (Wikman, 2006). Survey research provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying responses of a sample of that population and using data from that sample to derive conclusions (Creswell, 2014). The survey was administered online to high school English and mathematics teachers. The survey instrument contained 18 questions focused on formative assessment strategies and eight demographic questions. Participant responses to the non-demographic questions are subjective teacher perceptions.

Creswell (2014) suggests that if an existing instrument is available, a description of the previously established validity of the scores will typically be included in the study. The survey instrument used for this study—Frequency of Formative Assessment Strategies—incorporated three survey instruments developed by the Pearson Assessment Training Institute under the direction of Chappuis, Stiggins, Chappuis, and Arter (2012) on formative assessments strategies. The final questions used in the survey are based on Nyquist's (2003) research on feedback.

The Pearson Assessment Training Institute was founded by Rick Stiggins in 1992 to become a resource for teachers to develop the skills required to develop learning tools that will gather accurate information on student achievement where students are at the

center of learning (Pearson, 2014). All three instruments are activities described in *Classroom Assessment for Student Learning Doing It Right – Using It Well*. Table 4 outlines the sources for the survey instrument. The first set of questions was created as a self-assessment instrument to be administered after understanding the first three strategies of seven strategies of assessment for learning. The questions focus on the extent to which strategies one through three are in place. The next section of the survey focus on participants responding on implementation of classroom assessment practices. The next set of questions are derived from a survey instrument that asks participants if the assessment is formative and to what extent are each of the conditions of formative assessment practices are in place. The final set of questions asks the participant to indicate their frequency and use of specific types of feedback established by Nyquist (2003). Permission to use all three documents was granted by the Pearson Assessment Training Institute (S. Chappuis, personal communication, October 8, 2014). For the purpose of my study, the instrument was amended and was piloted by replacing the words learning targets with critical learning standards. The term critical learning standard is the operationalized term in the school District the survey will be administered. Critical learning standards represent the standards taught within the curriculum.

Table 4

Sources for Survey Questions

Question Category	Source
Professional Characteristics & Background	I created the questions to establish professional characteristics and background information on teacher participants (questions 1-6, 12-15).
Formative Assessment	Question 7 and 10 (Chappuis et al., 2012) Activity 2.5 Prerequisites for Self-assessment and Goal Setting (a-d)

Question Category	Source
Strategies	Activity 2.3 Self-Evaluation Survey (e-h, l) Activity 4.3 Audit an Assessment for Clear Purpose (i-k, m)
Feedback	Question 8 and 11, I created the questions based on the research of Nyquist (2003).

Note. See Appendix A.

Since the instrument was modified and combined, it was recognized that the original validity and reliability may not hold, whereas an established instrument has documented validity and reliability from previous administrations (Creswell, 2014). To assess the survey instrument on wording, flow, format, clear directions, and length of survey, the instrument should be piloted by participants similar to the study population (Nardi, 2003). Upon IRB approval, the survey was piloted early December by 10 teachers in the district, similar to the study population. The pilot participant sample provided feedback on the clarity of terms, flow of the survey and overall experience including the length of the time necessary to complete the survey.

Independent Variables

The following are the categorical independent variables used in analyses: content taught, gender, number of teacher preps, degrees earned and professional learning opportunities. The number of years teaching is an interval-level independent variable. Participants were asked to enter the numbers of years they have taught. The number of years teaching was grouped to create categorical independent variables for the research.

Dependent Variables

The following are the dependent variables used in the analyses: level and use of formative assessment strategies, level and use of feedback strategy, and the type of feedback used most often. The dependent variable is the response presumed to be caused

or influenced by the independent variable (Creswell, 2014). The following five statements were used to operationalize types of feedback for the purpose of this study:

1. Weaker feedback only, the students are simply given a grade or score;
2. Feedback only, students are not only provided a grade or scores, but also they are provided clear statements on corrective knowledge to correct their answers;
3. Weak formative assessment, students are given both information about the correct response and some explanation;
4. Moderate formative assessment includes the information defined in the weak formative assessment and suggestions for improvement;
5. Strong formative assessment includes everything stated previously and students are assigned specific activities to improve student understanding of the concepts (Nyquist, 2003).

The preceding five statements were used to collect information about the frequency and use of formative assessment strategies used in instructional process as a purpose of this study. The specific instructional strategies are listed on the teacher survey in Appendix A. Participants responded to the survey items using a 4-point frequency scale, ranging from 1 (almost never) to 4 (almost always).

Reliability and Validity

The more reliable the results are from the instrument, the more valid they will be (Creswell, 2005). In a quantitative or qualitative process, the researcher checks the reliability and validity of the study. Reliability refers to the consistency and stability of the scores (i.e., how respondents answer the questions), and validity refers to the

accuracy of the inferences or interpretations of the analysis (Creswell, 2005; Johnson & Christensen, 1998).

Identifying, defining, and determining how to measure key concepts is critical to the evaluation of the validity of the research (Engel & Schutt, 2009). Developing a questionnaire with high levels of validity and reliability is clearly a challenge. Any prototype would need to be tested through a pilot study (Oliver, 1997). Creswell (2014) identifies three traditional forms of validity: (a) content validity, (b) predictive or concurrent validity, and (c) construct validity. Stiggins (personal communication, October 20, 2014) provided clarification that the formative assessment survey questions were generated through the analysis of research, specifically based on the work of Black and Wiliam (1998) and Hattie and Timperley (2007). Thus the research established the value and validity of the questions.

In a case where the instrument needs to be modified or combined with another instruments to meet the needs of the study, both validity and reliability might need to be established. Piloting the amended survey allowed verification that teachers understood the directions, the content, and the possible responses. The participants who piloted the survey provided recommendations on the survey tool prior to deployment (Borg, Gall & Gall, 2007). Cronbach's alpha coefficients measured internal consistency of the independent variables (Vogt & Johnson, 2011).

The extent to which an instrument measures what it is intended to measure is referred to as validity (Vogt & Johnson, 2011). The validity of the research can be compromised by either internal or external factors. Internal threats to validity include the execution of the experimental procedures, treatments, and experiences of participants

(Creswell, 2014). Emotions can be high when discussing assessment practices. Teachers who have not previously considered effective feedback practices might be apathetic to the survey compared with those who regularly engage with students in a feedback. Teachers communicating during the survey process could influence their answers therefore being an internal threat.

External validity is compromised when inferences are incorrectly drawn. In other words, evaluating the magnitude to which the study's results can be generalized to the larger population (Merriam, 2009). As a researcher conducting a study within the district where I am employed, it will be imperative that I am aware of any biases. It would be advisable to replicate the study to see if the same conclusions would be drawn (Creswell, 2014).

Data Collection Procedures

To answer research questions, data analysis techniques are established and used to guide the analysis process increasing the validity and accuracy of the reformation derived from the analysis (Sampson, 2012). Data collection includes identifying study participants, obtaining permission to study them, and gathering information (Creswell, 2005). The following section clearly identifies the processes and procedures which were a benefit to the study, and which strengthen and established the validity and reliability of the study. This step is crucial for dissertation research (Sampson, 2012).

After IRB approval and piloting of the survey, an email was sent to the participants with an informed consent form, as well as a link to the online survey. Mail surveys have been criticized because of typically low response rates (Berdie, Anderson, Niebuhr, 1986; Oliver 1997). Therefore, I used an online survey administered through

use of an online product, *Select Survey*, which allowed for reminders to be sent to the participants. A confidential and voluntary online survey (Appendix A) was used to collect data from junior-level (11th grade) English teachers and Algebra II mathematics teachers. Included in the title page of the survey is the purpose of the study and the impact on education along with the consent letter. Once the teachers clicked the button to proceed to the survey questions, they indicated their agreement to participate in the study. A primary concern for the researcher is that all participants retain their confidentiality. At no time was the teacher's name associated with the survey (see Appendix B for the consent form provided to all participants). After the first week, a reminder email was sent to the teachers to complete the survey if they were willing to participate (Sampson, 2010). Oliver (1997) recommends the researcher should place themselves in the position of potential participants and consider factors that would encourage higher response rates. The online survey system, SelectSurvey, allowed the developer to create a survey with several different question styles. In addition, reports were available for researchers to review and/or download. The results can also be imported into SPSS, a software package used for statistical analysis.

In December 2014, technology services from the district prepared an electronic file of the requested secondary data and sent it by the second week of December. I received a password-protected MS Excel spreadsheet data file with the participants email addresses. Teacher email addresses are public information and located on each school's website.

The survey data is stored on an external hard drive in a locked cabinet when not in use. Only I, as the researcher, have access to the data stored on the external hard drive.

As the data was prepared for import into SPSS for analyses, I saved a copy of the file with a new filename; the original file will be kept intact as a backup. The researcher will keep all files and any related paperwork locked in a filing cabinet for five years (Creswell, 2014). At the end of five years, I will shred all paper hard copies of the data and delete all electronic data files.

Data Analyses Procedures

After obtaining the assessment and survey data, the data was prepared to import into SPSS. Creswell (2014) suggests a six step process for data analysis. The first step was to report information about the sample. Since I only reported on the participants who responded, I addressed step two which was to determine the effect of nonresponses on the overall results (response bias). A researcher must select a method to determine response bias. Whether the research approach is qualitative, quantitative, or mixed methods, there is an inevitable level of bias by the researcher. If all participants would have responded, would it have changed the results? Bias implies that when non-respondents do not complete the survey, their responses could have potentially impacted the overall results and research findings (Creswell, 2014). A way to check for respondent/non-respondent response bias is to send a reminder to the participants to complete the survey. Adding this step to the procedure increased the response rate, therefore decreasing the response bias (Creswell, 2005). I sent three reminder emails.

Steps three through five include providing descriptive analysis for the data, describing analysis beyond descriptive statistics, and determining the best statistical tests to match the purpose of the study and the hypotheses.

Variables

The first set of dependent variables is the following formative assessment strategies:

- Students are informed of the learning standards prior to instruction or assessment;
- Assignments are aligned to identified standards;
- Student work examples are provided to students;
- Formative assessments guide instruction;
- Learning opportunities are provided to students to engage in and get feedback,
- Modifications are made to instruction when students do not perform well.

The second set dependent variables used was the type of feedback. The first level is *weaker feedback only*. The students are simply given a grade or score. The next level is *feedback only*. At this level, not only are students provided a grade or scores, but also they are provided clear statements on corrective knowledge to correct their answers. The third level is *weak formative assessment*. Students are given both information about the correct response and some explanation. The *moderate formative assessment* includes the information defined in the *weak formative assessment* and suggestions for improvement. The final level is *strong formative assessment* which includes everything stated previously and students are assigned specific activities to improve student understanding of the concepts.

Research Questions

The main research question is what are the levels of use of formative assessment practices for high school English and math teachers? This question is subdivided into eight sub-questions. Research Question 1a, determined the difference between the levels of use of formative assessment strategies by English teachers and by mathematics teachers, will be analyzed using a series of t-tests. The null hypothesis for RQ 1a is that there are no differences in the level of use of formative assessment strategies by English and mathematics teachers. The research hypothesis for RQ 1a is: was there is a difference in the level of use of formative assessment strategies by English and mathematics teachers?

RQ 1b focused on determining the difference in the levels of use of formative assessment strategies used among development courses, average level courses, and accelerated courses by English and mathematics teachers. The null hypothesis for RQ 1b is that there are no differences in the means between groups. The research hypothesis for RQ 1b is: was there is a difference in the means between groups? A one-way ANOVA was conducted to evaluate the relationship between the course level taught and formative assessment strategies.

RQ 1c focused on the differences in the level of use of formative assessment practices and the number of different courses taught by English and mathematics teachers. The null hypothesis is there is no difference and the research is there is a difference in the level of use of formative assessment strategies and number of preps taught. A one-way ANOVA was conducted to evaluate the relationship between formative assessment strategies and the number of preps taught.

RQ 1d focused on the relationship between the level of use of formative assessment practices and teacher's perceptions of their knowledge of these practices. The null hypothesis is there is no relationship and the research hypothesis is a relationship exists between the level of use of formative assessment practices and teacher's perceptions of their knowledge of formative assessment practices. A one-way ANOVA was conducted to evaluate the relationship between the level of use of formative assessment practices and teacher's perceptions of their knowledge of formative assessment practices.

RQ 1e, determined the difference between the levels of use of formative assessment strategies by gender, will be analyzed using a series of t-tests. The null hypothesis for RQ 1e is that there are no differences in the level of use of formative assessment strategies by gender. The research hypothesis for RQ 1e is there is a difference in the level of use of formative assessment strategies by gender.

RQ 1f determined if there is a relationship between the level of use of formative assessment practices and years of teaching experience. The years of teaching experience was converted in categorical independent variables. A one-way ANOVA was conducted to evaluate the relationship between the level of use of formative assessment practices and years of teaching experience.

RQ 1g determined the differences in the level of use of formative assessment practices based on teacher qualifications by conducting a series of t-Tests. The null hypothesis there is no difference and the research hypothesis is there is a difference in the level of use of formative assessment practices based on teacher qualifications.

RQ 1h determined the level of use of formative assessment practices based on professional learning opportunities by first conducting a series of t-tests. The null hypothesis for RQ 1h is that there are no differences in the level of use of formative assessment strategies based on professional learning opportunities. The research hypothesis for RQ 1h was: is there is a difference in the level of use of formative assessment strategies based on professional learning opportunities?

Then, I determined if there was a relationship between combining professional learning opportunities and the level of use of formative assessment practices by conducting an analysis of covariance (ANCOVA). The ANCOVA attempts to make allowance for imbalances between groups or equalize the differences (Salkind, 2011; Vogt & Johnson, 2011). The first assumption for the ANCOVA was the relationship is linear (Boslaugh, 2012). During preliminary analysis, I examined the relationship between the dependent variable (formative assessment strategies) and the covariate (professional learning opportunities) by creating a scatter plot of the data points, in addition to conducting an ANOVA on the covariate. The second assumption is the regression lines for each individual group will be linear and parallel; this is the assumption of homogeneity of regression slopes (Field, 2012). This assumption is examined with an F-test on the interaction of the types of feedback and the course level of the students. The test statistic for ANCOVA or an ANOVA is the F-test. The F ratio compares the variation between each of the categories relative to the variation within the categories (Nardi, 2003). The determination of significance is based on the t value and when the p value is less than 0.05 (Salkind, 2011). If the p value is less than 0.05, the results are significant, the null hypothesis is rejected and the research hypothesis is

accepted. If significance was found, a post hoc comparison report will be created. A linear regression analysis will be conducted to evaluate if the greater the level of the feedback, the higher percentage of students will attain standards. Each analysis will be followed by a post hoc test (Bonferroni) to determine which groups had significant differences between the group means. The post hoc test will be used to determine which group means are statistically significant from one another.

Limitations

There are limitations when using quantitative methods in educational research. Quantitative research does not expand beyond the scope of the research questions or hypotheses. A limitation of quantitative research can be its propensity for breadth over depth (Berg & Lune, 2004). Hypotheses are not developed during the quantitative process; the quantitative process tests the identified hypotheses. The process is not flexible; results are limited to numerical descriptions compared to narrative descriptions with qualitative research (Singh, 2007). Limitations identified by the researcher establish potential weaknesses in the study and identifying the limitations assists in determining how much the findings can be generalized (Creswell, 2005).

A limitation in survey research is created by the window of time available for survey of the teaching staff. The district benchmark assessment data will be from the spring 2014 final exam window at the end of the academic year. The next opportunity to survey the teachers is the following fall when the teachers return for the start of the next school year. This will require teachers to recall their actions from the previous school year. A benefit to this option is that teachers could reflect on the type of feedback given to students and how their students performed on the district benchmark assessment.

Several factors not identified as part of the study might have influenced the results of the assessment which in turn would influence the analysis (Amaratunga, Baldry, Sarshar, & Newton, 2002). For example, this is the pilot year for student growth impacting teacher evaluation ratings per the Illinois State Board of Education. Teachers may confuse current formative assessment practices with what they did last school year.

Additional limitations were due to factors and variables beyond my control. For example, years of teaching experience, educational training or professional learning opportunities, teaching style of the teachers.

Measurement of the independent variables may affect external validity of the study. The formative assessment strategies and types of feedback are by no means a complete nor agreed upon listing among experts in the field.

Ethical Considerations

There are seven principles the American Educational Research Association (2011) has approved for researchers to follow: professional competence, integrity, professional, scientific, and scholarly responsibility, respect for people's rights, dignity, and diversity, and social responsibility. As a researcher, my ability to collect, evaluate and report on student data obtained from the high school district and survey results without revealing names of the schools, individual students, or the teacher identities will greatly reduce any ethical concerns or issues. As a district level administrator, I oversee assessment and data for the district. It was imperative for me to have someone else prepare the data to ensure that individual names were not included. Though I am a district office administrator I do not evaluate teachers nor have a direct supervisory role over any of the potential participants in this study.

There are four ethical principles or conditions that support the respect of participants: (a) voluntary participation, (b) informed consent, (c) no harm to participants, and (d) anonymity and confidentiality (De Vaus, 2001). The identification of participants presents both a benefit and a limitation. I benefit from working for a large high school district with a diverse student population (e.g. ethnicity, limited English proficiency, and socio-economic status) as indicated above in description of student population. Therefore, I have access teacher participants. A limitation to the study is that the participants might feel compelled to participate based on my role in the district and the importance district administration has placed on the doctoral cohort and participants' studies. Teacher participants were asked if they are willing to participate. Teachers consented to participate in the study after proceeding from the introduction page of the survey. Respect for privacy will be maintained throughout the study by not referring to the school, district or teacher names.

A concerted effort was made to avoid deceiving participants, respecting power imbalances, and assuring that there will be no exploitation of participants (Creswell, 2014). Participant names will not be included in the data sets. I will make every attempt to maintain confidentiality, an informed consent letter, and promises and reciprocity (Merriam, 2009). Institutional Review application is written protocols as well as methods and procedures that will be used to conduct the study. The IRB adds an additional layer to protect the participants and validate the methods used for research. Institutional Review Board approval was received prior to conducting the research project.

CHAPTER IV

RESEARCH FINDINGS

What to do when students do not learn the intended learning standards?

According to Knight (2013) knowing how to answer this question remains a challenge facing teachers. Assessments for learning focus on the assessment tool to enhance learning aimed at instructional practices not just measuring the learning. Knight (2013) reported the benefits of formative assessments are only achieved when teachers employ specific assessment for learning strategies or practices. Studies have indicated that assessments for learning strategies have had a significant impact on student learning (Black & Wiliam, 1998b; Bloom, 1984; DuFour, Eaker & DuFour, 2005; Hattie & Timperley, 2007; Meisels et al., 2003; Nyquist, 2003; Rodriquez, 2004). Understanding the tools that have significant impact on student learning might be of interest to a greater number of teachers in wake of the Performance Evaluation Reform Act (PERA) which requires school districts to use student performance data to evaluate and improve teaching (Illinois Administrative School Code Part 50, 2014). In order to attempt to maximize student growth or attainment of standards, teachers will potentially be looking for tools, such as formative assessments, to raise levels of student achievement. While there is evidence to support this idea (Wiliam et al., 2004; Wiliam & Thompson, 2007), the

problem examined in this study is whether or not differences exist in the implementation of formative assessment strategies between English and mathematics teachers.

English and mathematics teachers were administered a survey asking about their level of use of formative assessment strategies, level and use of types of feedback, and which type of feedback they provide to their students most often. This research study was designed to determine if differences exist in the levels of use of formative assessment strategies in junior-level high school courses specifically including types of feedback by English and mathematics teachers. To make determinations, participants were administered a frequency scale survey on the level of use of various formative assessment strategies used in the classroom. The goal of the research is to determine whether the levels of formative assessment strategies vary by:

- content area taught (English vs. mathematics),
- course type within content area (accelerated courses vs. developmental courses),
- number of different courses taught,
- teacher's perceptions of their knowledge of these practices, and other teacher demographics (e.g., gender, years of experience, degrees/ qualifications, participation in professional learning activities),

The purpose of this chapter is to present the results of the statistical analyses designed to answer the research question and sub-questions. This chapter includes descriptive statistics (frequencies, percentages, means, and standard deviations), and the results of the chi-square tests, *t*-tests, analyses of variance (ANOVAs), and the analyses of covariance (ANCOVA).

Research Questions

1. What are the levels of use of formative assessment practices for high school English and math teachers?
 - a) Do the levels of use of formative assessment practices vary by content area taught (i.e., English teachers vs. math teachers)?
 - b) Do the levels of use formative assessment practices vary by course type within subject area (i.e., accelerated courses vs. developmental courses)
 - c) Do the levels of use formative assessment practices vary by the number of different courses taught?
 - d) Do the levels of use formative assessment practices vary by teacher's perceptions of their knowledge of these practices?
 - e) Do the levels of use formative assessment practices vary by gender?
 - f) Do the levels of use formative assessment practices vary by years of teaching experience?
 - g) Do the levels of use formative assessment practices vary by teacher degrees/qualifications?
 - h) Do the levels of use formative assessment practices vary by participation in professional learning activities?

Results

The data was collected from a large high school district located in the northwest suburbs of Chicago, Illinois. The school population consists of 12,164 students and 900 teachers within five high schools. For the purpose of this research the participants were selected based on the content areas and courses they teach; junior-level English courses

and Algebra 2. These are the end courses determined for PARCC assessment administration by the Illinois State Board of Education. The results of this data analysis answered the research question and sub-questions regarding differences in the level of use of formative assessment strategies.

Demographics of Participants

The online survey was sent, via email, to 149 teachers (79 English teachers and 72 mathematics teachers) across five high schools within one school district. Initial review indicated 125 teachers responded to the survey, but after closer review, some participants only answered the demographic questions. Therefore, 19 responses were eliminated from the final dataset, leaving a total of 106 viable cases for the purposes of analyses. The following are the categorical independent variables used in analyses: content taught, gender, number of teacher preps, degrees earned and professional learning opportunities. The number of years teaching is an interval independent variable. Participants were asked to enter the numbers of years they have taught. The number of years teaching was grouped to create categorical independent variables for the research. The following are the dependent variables used in the analyses: level and use of formative assessment strategies, level and use of feedback strategy, and the type of feedback used most often. The number of participants who responded from the English and mathematics departments and their demographic characteristics are reported in Table 5.

The number of preps each teacher has for the current school year is reported in Table 5. A “prep” is a unique course within the content area. For example, if a teacher reported one prep, they would teach the same course in a given academic school year. If a teacher reports four preps, they teach four unique courses throughout the school day.

Table 5

Participant Demographic Distribution

	N	%
Content		
English	49	46.2
Mathematics	57	53.8
Gender		
Female	58	54.7
Male	43	42.6
Degrees		
Bachelors	106	100.0
Masters	88	83.0
National Board Certification	16	15.1
Years Teaching		
1-4 years	14	13.2
5-9 years	20	18.9
10-13 years	24	22.6
14-20 years	27	27.4
21-34 years	19	17.9
Preps		
1 prep	6	5.7
2 preps	10	9.4
3 preps	64	60.4
4 preps	20	18.9
5 preps	6	5.7
Course Level		
Developmental	31	29.2
Average	38	35.8
Accelerated	32	30.2

Participants were asked which course they taught, based on their response Table 5 outlines the number and percentage of teachers instructing at each academic course level. Five teachers did not indicate which English or mathematics course they currently taught.

English or mathematics courses are often offered at varying academic rigor levels. The participants were almost equally distributed between teaching developmental, average, and accelerated coursework (Table 5).

Teachers are required to have at least a Bachelor's degree, therefore one can conclude all participants have earned at least of Bachelor's degree. Eighty-three percent of the participants have earned a master's degree and 15% have earned National Board Certification (Table 5). Additional teacher certifications included: certificate of studies in administration, cooperative work training certificates, English as a second language certification, general graduate coursework, and currently pursuing a masters or doctoral degree.

Besides, earning a graduate degree, teachers have opportunities to participate in professional learning activities. Teachers were asked to indicate all the types of professional learning activities they participated in on formative assessment strategies. In addition to workshop/conference (51%), webinar (2%), coursework (56%), personal learning network (PLN) (47%), and own reading (52%), teachers were able to indicate additional learning opportunities. Teachers who reported additional professional learning activities indicated collaborating with colleagues, indistrict courses, institute days, self-reflection, professional learning communities, and previous employer professional learning activities. Indistrict courses are taught by the school district staff for the school district staff exclusively.

Teachers were also asked about their perceptions of their own knowledge of formative assessment strategies. More than half of the participants (57%) reported they

felt they had a basic understanding of the strategies, 29% reported feeling very knowledgeable, and only 11% reported feeling they need to know more.

Use of Formative Assessment Strategies

In addition to the demographic questions, teachers were asked to report on their level of use of formative assessment strategies. Teachers reported varying levels of use of formative assessment strategies and types of feedback in their instructional practices on the survey. The frequency and distribution for each of the questions for formative assessment strategies and types of feedback is reported in Appendix C. Teacher responses were based on four-point frequency scale ranging from *almost never* to *almost always* (Appendix C). When asked about the frequency level survey item on “Instruction centering on critical learning standards,” 66% of mathematics teachers responded *almost always* compared to 43% of English teachers. For survey item “Providing examples of strong or weak products to help students understand the key elements of quality work” it was reported as *almost always* by 33% of English teachers compared to 16% of mathematics teachers. For the item, “Aligning assessments directly to the critical learning standards” it was also more prevalent for mathematics teachers (56% reporting *almost always*) compared to English teachers (38%). This was also the case for the survey item “designing the assessment instrument aligned directly to the critical learning standards.” Mathematics teachers reported *almost always* using this strategy 58% of the time compared to English teachers, 33% of the time. For the survey item on the formative assessment strategy of matching the standards taught to the items on the assessment instrument was *almost always* practiced by mathematics teachers (54%) compared to English teachers (31%). For the survey item “Having results available in

time for students to take action,” *almost always* happens for 60% of mathematics teachers and 49% of English teachers.

For the level of use of students “given only a grade or score”, weaker feedback only was used *usually* to *almost always* by 10% of English teachers compared to 43% of mathematics teachers. The next level of feedback when students are “provided a grade or score and clear statements about corrective knowledge” (feedback only) was reported as *usually* to *almost always* 88% of the time by English teachers and 70% of the time by mathematics teachers. For the level of use of feedback, “moderate formative assessment” feedback was *usually* to *almost always* given 88% of the time by English teachers compared to 66% of the time by mathematics teachers (Appendix D).

A composite score was generated for the thirteen questions on the level of use of formative assessment strategies as well as the level of use of types of feedback. The composite score was generated as a mean score for participants who answered at least eleven out of the thirteen questions. For the types of feedback, the composite mean score was generated only for participants who answered all five questions. The composite score for both formative assessment strategies and feedback is an interval-level variable that was used in the following analyses.

The main research question is what are the levels of use of formative assessment practices for high school English and math teachers? This main research question is subdivided into eight sub-questions. For each sub-question the analysis examined overall formative assessment strategies. Then, specifically type of feedback and finally, which type of feedback is used most often.

Research Question 1a

The first sub question is do the levels of use of formative assessment practices vary by content area taught (i.e., English teachers vs. math teachers)?

Null Hypothesis 1

H_{01} = There is no difference between the levels of use of formative assessment strategies by English teachers and by mathematics teachers.

Research Hypothesis 1

H_1 = There is a difference between the levels of use of formative assessment strategies by English teachers and by mathematics teachers.

A series of independent samples *t*-tests were computed on variables to examine potential differences between content taught and levels of use of assessment for learning strategies and level of use of types of feedback. The mean differences between two independent groups of teachers was compared, the same participants were not surveyed more than once; therefore, the appropriate test of significance is an independent samples *t*-test (Salkind, 2011). The first independent samples *t*-test was computed with the independent content variables (English or mathematics) and the dependent variable level of use of formative assessment strategies. The composite score was used for the analyses. No statistically significant differences were observed between content taught and level of use of formative assessment strategies ($t_{(102)} = -.86, p=.39$). Since the *p*-value is greater than .05 the results are not significant, the null hypothesis was accepted, and the research hypothesis was rejected (Table 6).

An independent samples *t*-test was then computed on the specific formative assessment strategy, feedback and content. Again, no statistically significance difference

in group means between content taught and level of use of the type of feedback was observed ($t_{(101)} = .25$, $p=.81$). The null hypothesis was accepted and the research hypothesis was rejected

Table 6

T-tests for Differences in Content and Level of Use of Formative Assessment Strategies

	English		Mathematics		df	<i>t</i>	Cohen's <i>d</i>
	M	SD	M	SD			
Formative assessment strategies	3.06	.49	3.15	.46	102	-.86	-.17
Type of feedback	2.75	.51	2.73	.60	101	.25	.05

The type of feedback used most often by English teachers (53%) is moderate formative assessment and the type of feedback used most often by mathematics teachers (33%) is weak formative assessment (Table 7). A Pearson correlation coefficient was computed to assess the relationship between content taught and the type of feedback provided most often. There was a weak relationship between the variables $r(103) = .23$, $p < .05$.

Table 7

Teachers Response to Which Type of Feedback Provided Most Often

Type of Feedback	English		Mathematics	
	N	%	N	%
Students are given only a grade or score (Weaker Feedback Only).	4	8	8	15
Students are not only provided a grade or scores, but also they are provided clear statements on corrective knowledge to correct their answers (Feedback Only).	6	12	9	17
Students are given both information about the correct response and some explanation (Weak Formative Assessment).	6	12	18	33

Type of Feedback	English		Mathematics	
	N	%	N	%
Students are given information about the correct response, some explanation and suggestions for improvement (Moderate Formative Assessment).	26	53	14	26
Students are given information about the correct response, some explanation, suggestions for improvement and students are assigned specific activities to improve student understanding of the concepts (Strong Formative Assessment).	7	14	5	9

Since there are two categorical variables being compared from a single population, a chi-square test of independence was appropriate to determine if the number of occurrences across categories is random or was they equally distributed across all categories (Salkind, 2011). A chi-square test of independence was computed to determine associations between the categorical variables content and type of feedback provided most often $\chi^2_{(1, N=103)} = 11.65, p=.020$ (Table 8). The type of feedback provided to students most often was associated with whether the participant taught English or mathematics. Specifically related to feedback provided, the null hypothesis was rejected and the research hypothesis was accepted.

Table 8

Prevalence in Content and Type of Feedback Provided Most Often

Type of Feedback Used Most Often	English		Mathematics		χ^2	Cohen's <i>d</i>
	N	%	N	%		
Weaker Feedback Only	4	33.3	8	66.7	.02*	.03
Feedback Only	6	40.0	9	60.0		
Weak Formative Assessment	6	25.0	18	75.0		
Moderate Formative Assessment	26	65.0	14	35.0		
Strong Formative Assessment	7	47.6	5	41.7		

* $p < .05$

In conclusion, the null hypothesis was accepted and the research hypothesis was rejected. However, there was a statistically significant difference found between content area and the type of feedback provided to students most often.

Research Question 1b

Do the levels of use formative assessment practices vary by course type within subject area (i.e., accelerated courses vs. developmental courses)?

Null Hypothesis 2

H₀₂ = There is no difference in the levels of use of formative assessment strategies used among development courses, average level courses, and accelerated courses by English and mathematics teachers.

Research Hypothesis 2

H₂ = There is a difference in the levels of use of formative assessment strategies used among development courses, average level courses, and accelerated courses by English and mathematics teachers.

A chi-square test of independence was computed to determine associations between the categorical variables course level and content $\chi^2_{(1, N=101)} = 8.99, p=.01$ (Table 9). There was a significant relationship between course level taught and content area.

Table 9

Prevalence in Course Level and Content

Course Level	English		Mathematics		χ^2	Cohen's <i>d</i>
	N	%	N	%		
Developmental	9	29.0	22	71.0		
Average	24	63.2	14	36.8	.01*	.02
Accelerated	12	26.7	20	35.7		

*p<.05

A one-way analysis of variance (ANOVA) was conducted to evaluate the relationship between course level and formative assessment strategies (Table 10). The independent categorical variable has more than two categories (developmental, average, and accelerated); therefore, the appropriate test of significance is an analysis of variance (Salkind, 2011). The independent variable was comprised of three categories: developmental, average, and accelerated courses. The first ANOVA for this research question included all the participants' responses. The dependent interval-level variable was the type of formative assessment strategies. The results of the ANOVA were not significant ($F_{(2,96)} = 1.58, p = .21$). Therefore, the null hypothesis was accepted and the research hypothesis was rejected. The level and use of formative assessment strategies by teachers did not differ by course level taught.

To determine if there were any statistically significant differences for either content area, two additional ANOVAs were conducted isolating the content variable. An ANOVA was conducted to evaluate the relationship between the English course level taught and the level of use of formative assessment strategies. The independent variable was the course level (developmental, average, or accelerated) and the dependent variable was the level and use of formative assessment strategy composite score. The results of the ANOVA were not significant for English teachers ($F_{(2,42)} = .96, p = .39$).

An ANOVA was also conducted to evaluate the relationship between the mathematics course level taught and the level of use of formative assessment strategies. The independent variable was the course level (developmental, average, or accelerated) and the dependent variable was the level and use of formative assessment strategy composite score. The ANOVA was not significant for mathematics teachers ($F_{(2,51)} =$

1.58, $p = .22$). Based on the mathematics course level taught, the teacher did not change the level of use of formative assessment strategies.

Table 10

Mean Differences in Course Level and Formative Assessment Strategies

	Mean Difference (Std Err)			
	Developmental Coursework	Average Coursework	Accelerated Coursework	Cohen's <i>d</i>
English	3.13 (.10)	3.00 (.10)	3.23 (.06)	.04
Mathematics	3.27 (.09)	3.07 (.12)	3.03 (.11)	.06
Combined	3.23 (.07)	3.03 (.08)	3.11 (.09)	.03

An ANOVA was conducted to evaluate the relationship between course level and types of feedback (Table 11). The independent variable was the course level (developmental, average, accelerated courses). The dependent variable was the composite score of the level of use of types of feedback used in teacher practices. The ANOVA was not significant ($F_{(2,95)} = .89$, $p = .42$). Post hoc comparisons (Bonferroni) found no significant differences in the means between the groups. The level and use of various types of feedback did not change based on the course level taught by the teacher. Therefore, the null hypothesis has been accepted and the research hypothesis was rejected.

Table 11

Mean Differences in Course Level and Level of use of Types of Feedback

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference		Min	Max	Effect Size
					Lower	Upper			
Developmental Coursework	29	2.85	.64	.12	2.61	3.09	1.6	4.0	.14
Average Coursework	38	2.67	.51	.08	2.51	2.84	1.8	3.6	
Accelerated Coursework	31	2.70	.53	.10	2.62	2.85	1.4	4.0	

In conclusion, the null hypothesis was accepted and the research hypothesis was rejected. There was no significance found between course level and level of formative assessment strategies.

Research Question 1c

Do the levels of use formative assessment practices vary by the number of different courses taught?

Null Hypothesis 3

H_{03} = There is no difference in the level of use of formative assessment practices based on the number of different courses by English and mathematics teachers.

Research Hypothesis 3

H_3 = There is a difference in the level of use of formative assessment practices based on the number of different courses by English and mathematics teachers.

An ANOVA was conducted to evaluate the relationship between content taught (English and mathematics) and the number of preps (1, 2, 3, 4 or 5) (Table 12). The independent variable was the number of preps and the dependent variable was level of

use of formative assessment practices. The ANOVA was not significant ($F_{(4,99)} = 1.02$, $p = .40$). The number of preps a teacher has did not significantly change his or her level of use of formative assessment strategies. Therefore, the null hypothesis was accepted.

Table 12

ANOVA for differences in Number of Preps and Level of use of Formative Assessment Strategies

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference		Min	Max	Effect Size
					Lower	Upper			
1 prep	6	3.38	.44	.18	2.93	3.84	2.6	3.8	
2 preps	10	3.23	.45	.14	2.91	3.56	2.3	3.8	
3 preps	62	3.10	.49	.06	2.98	3.22	1.8	4.0	.20
4 preps	20	2.99	.46	.10	2.77	3.20	2.0	3.7	
5 preps	5	3.12	.22	.10	2.85	3.39	2.8	3.3	

An ANOVA was conducted to evaluate the relationship between number of preps and level of use of the types of feedback provided to students (Table 13). The independent variable was the number of preps and the dependent variable was the type of feedback composite score. The ANOVA was significant ($F_{(4,98)} = 2.89$, $p = .03$). The number of preps did have a significant association with the level of use of types of feedback. Post hoc comparisons (Bonferroni) found significant differences in the means between one prep and two preps ($p = 0.05$).

Table 13

Mean Differences in Number of Preps and Level and Use of Type of Feedback

	Mean Difference (Std Err)					Cohen's <i>d</i>
	1 Prep	2 Preps	3 Preps	4 Preps	5 Preps	
English	4.00 (.00)	4.40 (.25)	3.30 (.24)	3.27 (.32)	4.67 (.33)	.11
Mathematics	3.33 (1.20)	2.20 (.58)	3.08 (.17)	2.40 (.51)	4.00 (1.00)	.12
Combined	3.23 (.19)*	2.44 (.21)*	2.72 (.07)	2.70 (.13)	3.16 (.15)	.11

Level of Significance: * $p < .05$

To determine if there was significance for either content area two additional ANOVAs were conducted isolating the content variable. An ANOVA was conducted to evaluate the relationship between the English teachers' number of preps and the level of use of types of feedback. The independent variable was the number of preps (1, 2, 3, 4, and 5) and the dependent variable was the type of feedback composite score. The ANOVA was not significant for English teachers ($F_{(4,44)} = 2.24$, $p = .08$). The number of preps of English teachers did not change the level of use of types of feedback.

An ANOVA was conducted to evaluate the relationship between the mathematics teachers' number of preps and the level of use of types of feedback. The independent variable was the number of preps (1, 2, 3, 4, and 5) and the dependent variable was the type of feedback composite score. The ANOVA was not significant for mathematics teachers ($F_{(4,49)} = 1.37$, $p = .26$). The number of preps of mathematics teachers has did not change the level of use of types of feedback. The number of preps and the type of feedback used most often was more significant for English teachers than mathematics teachers. In conclusion, the null hypothesis was accepted and the research hypothesis

was rejected. There was no significance found between the number of preps and the level of use of formative assessment strategies.

Research Question 1d

Do the levels of use formative assessment practices vary by teacher's perceptions of their knowledge of these practices?

Null Hypothesis 4

H_{04} = There is no difference in the level of use of formative assessment practices based on teacher's perceptions of their knowledge of these practices.

Research Hypothesis 4

H_4 = There is a difference in the level of use of formative assessment practices based on teacher's perceptions of their knowledge of these practices.

The correlation between teacher's perceptions of their knowledge and level of use of formative assessment strategies is significant, $r_{(99)} = .31, p=0.00$. However, this is a relatively weak relationship between the teacher's perceptions of their knowledge and level of use of formative assessment strategies.

An ANOVA was conducted to evaluate the effects of teacher's perceptions of their own knowledge of formative assessment strategies (I feel I need to know more, I feel I have a basic understanding, and I feel very knowledgeable) and their level of use of formative assessment strategies (Table 14). The independent variable was teacher's perceptions of their own knowledge of formative assessment strategies and the dependent variable was the formative assessment strategy composite score. There was a significant effect for perceptions of their own knowledge and level of use of formative assessment strategies ($F_{(4,98)} = 5.25, p = .01$). Post hoc comparisons (Bonferroni) found significant

differences in the means between teachers who need to know more and teachers who feel very knowledgeable ($p= 0.01$). In addition, post hoc comparisons found significant differences in the means between teachers who has a basic understanding and teachers who feel very knowledgeable ($p= 0.04$). Teachers' self-perception of their own knowledge of formative assessment strategies did have a significant association with the level of use of formative assessment strategies. The null hypothesis has been rejected and the research hypothesis has been accepted.

Table 14

Mean Differences in Teacher's Perceptions of Their Own Knowledge of Formative Assessment Strategies and Level of Use of Formative Assessment Strategies

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference		Min	Max	Effect Size
					Lower	Upper			
I feel I need to know more	12	2.85	.42	.12	2.58	3.12	2.0	3.5	.31
I feel I have a basic understanding	58	3.05	.47	.06	2.92	3.17	1.8	4.0	
I feel very knowledgeable	31	3.30	.44	.08	3.00	3.46	2.4	4.0	

For further analysis, a chi-square test of independence was computed to determine associations between the categorical variables (degrees earned, professional learning opportunities, and self-perceptions of knowledge of formative assessment strategies). The two categorical variables used in the first test is self-perceptions of knowledge of formative assessment strategies (I feel I need to know more, I feel I have a basic understanding, I feel very knowledgeable) and professional learning opportunity (conference/workshop, webinar, coursework, personal learning network (PLN), own reading (Table 15). Attending conferences/workshops and self-perceptions of knowledge

of formative assessment strategies were to be significantly related, $\chi^2_{(1, N=101)} = 5.85$, $p=.05$. Teachers reading on their own and self-perceptions of knowledge of formative assessment strategies were found close to be significantly related, $\chi^2_{(1, N=101)} = 5.59$, $p=.06$.

The two categorical variables used in the second test is self-perceptions of knowledge of formative assessment strategies (I feel I need to know more, I feel I have a basic understanding, I feel very knowledgeable) and qualifications (Table 16). Having a master's degree and self-perceptions of knowledge of formative assessment strategies was significantly related, $\chi^2_{(1, N=101)} = 7.96$, $p=.02$.

Table 15

Prevalence in Perceptions of Knowledge of Formative Assessment Strategies and Professional Learning Activities

	I feel I need to know more		I feel I have a basic understanding		I feel very knowledgeable		χ^2	Cohen's <i>d</i>
	N	%	N	%	N	%		
Conference/Workshop	4	7.8	26	51.0	21	41.2	.05*	.05
Webinar	0	0.0	0	0.0	2	100.0	.10	.06
Coursework	7	12.5	30	53.6	19	33.9	.67	.16
Personal Learning Network	3	6.4	26	55.3	18	38.3	.14	.07
Own Reading	8	15.4	24	46.2	20	38.5	.06	.05

* $p<.05$

Table 16

Prevalence in Perceptions of Knowledge of Formative Assessment Strategies and Degrees Earned

	I feel I need to know more		I feel I have a basic understanding		I feel very knowledgeable		χ^2	Cohen's <i>d</i>
	N	%	N	%	N	%		
Master's Degree	11	12.5	46	52.3	31	35.2	.02*	.03
National Board Certification	12	11.9	58	57.4	31	30.7	.74	.17

* $p < .05$

In conclusion, the null hypothesis was rejected and the research hypothesis was accepted. There was a statistically significant difference between teacher's perceptions of their knowledge of these practices and the level of use of formative assessment strategies.

Research Question 1e

Do the levels of use formative assessment practices vary by gender?

Null Hypothesis 5

H_{05} = There is no difference in the level of use of formative assessment practices based on teacher's gender.

Research Hypothesis 5

H_5 = There is a difference in the level of use of formative assessment practices based on teacher's gender.

A chi-square test of independence was computed to determine associations between the categorical variables content (English, mathematics) and gender (Female, male) $\chi^2_{(1, N=101)} = 4.09, p=.04$ (Table 17). There is a statistically significant difference between content and gender.

Table 17

Prevalence in Content and Gender

	Female		Male		χ^2	Cohen's <i>d</i>
	N	%	N	%		
Content	59	57.4	42	42.6	.04*	.04

* $p < .05$

A series of independent *t*-tests was computed to examine the differences between gender and levels of use of the formative assessment strategies. The first set of *t*-tests used the composite score for formative assessment strategies. Then, a series of *t*-tests were computed for each strategy listed on the survey by gender.

An independent samples *t*-test was computed on variables for the differences between gender and levels of use of assessment for learning strategies, feedback and the type of feedback provided most often (Table 18). No statistically significant differences were found between gender and level of use of formative assessment strategies ($t_{(99)} = 0.56$, $p = .58$). Since the *p*-value is greater than .05 the results are not significant, the null hypothesis was accepted and the research hypothesis was rejected.

Table 18

T-tests for Differences in Gender and Level of Use of Formative Assessment Strategies

	Df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		Cohen's <i>d</i>
					Lower	Upper	
Equal variances assumed	99	.58	.05	.10	-.14	.24	.11
Equal variances not assumed	87.18	.58	.05	.10	-.14	.25	

A series of independent samples *t*-tests were conducted to examine differences between gender based on content area and each of the thirteen formative assessment strategies listed in the survey (Table 19). The first set of *t*-tests was run based on English teachers' responses.

Table 19

Mean Differences in English Teachers' Responses between Formative Assessment Strategies and Gender

Strategy	Female		Male		df	t	p	Cohen's <i>d</i>
	M	SD	M	SD				
I communicate the critical learning standards to students in language they can understand, as a regular part of instruction.	3.16	.81	2.27	.80	45	3.53	.00**	1.11
Instruction centers on the critical learning standards.	3.25	.84	3.27	.70	45	-.07	.95	-.03
Assignments and assessments align directly with intended critical learning standards and instruction provided.	3.45	.72	3.00	.66	44	2.05	.05*	.65
Assignments and assessments are designed so that students can interpret results, in terms of intended learning. The results function as effective feedback.	3.25	.80	2.80	.86	45	1.75	.09	.54
I use examples and models of strong and weak work to help students understand key elements of a quality response, product, or performance.	3.03	.78	2.60	1.18	45	1.49	.14	.43
I offer feedback that links directly to the intended learning, pointing out strengths and offering information to guide	3.41	.67	2.87	.83	45	2.39	.02*	.72

Strategy	Female		Male		df	t	p	Cohen's <i>d</i>
	M	SD	M	SD				
improvement. Students receive this feedback during the learning process and have opportunities to improve on each learning target before the graded event.								
I design assignments and assessments so that students can self-assess, by identifying their own strengths and areas for further study in terms of the intended learning. The results of assignments and assessments function as effective feedback to students.	2.97	.74	2.50	1.02	44	1.76	.09	.53
I use assessment information to focus instruction on a day-to-day basis.	2.94	.77	2.73	.88	44	.79	.43	.25
The assessment instrument or event is designed so that it aligns directly with the critical learning standards to be learned.	3.19	.74	3.20	.68	45	-.06	.96	-.01
The instrument or event provides information of sufficient detail to pinpoint specific problems, such as misunderstandings, so that teachers can make good decisions about what actions to take, and with whom.	3.09	.73	2.53	.92	45	2.25	.03*	.68
All of the instrument or event's items or tasks match learning targets that have been or will be taught.	3.19	.74	3.07	.59	45	.56	.58	.18
I give students regular opportunities to track, reflect on, and share their achievement status and improvement.	2.94	.81	2.87	.83	44	.27	.79	.08

Strategy	Female		Male		df	t	p	Cohen's <i>d</i>
	M	SD	M	SD				
The results are available in time to take action with the students who generated them.	3.34	.75	3.07	.88	45	1.12	.27	.33

*p<.05, **p<.01

There was a statistically significant difference between the gender of English teachers and strategy 1, communicating the critical learning standards to students in language they can understand, as a regular part of instruction ($t_{(45)} = 3.53$, $p=.00$). Since the p-value is less than .05 the results are significant, the null hypothesis was rejected and the research hypothesis was accepted.

There was a statistically significant difference found between the gender of English teachers and strategy 3, assignments and assessments align directly with intended critical learning standards and instruction provided ($t_{(44)} = 2.05$, $p=.04$). Since the p-value is less than .05 the results are significant, the null hypothesis was rejected and the research hypothesis was accepted.

There was a statistically significant difference found between the gender of English teachers and strategy 6, feedback is linked directly to the intended learning, pointing out strengths and offering information to guide improvement. Students receive this feedback during the learning process and have opportunities to improve on each learning target before the graded event ($t_{(45)} = 2.39$, $p=.02$). Since the p-value is less than .05 the results are significant, the null hypothesis was rejected and the research hypothesis was accepted.

There was a statistically significant difference found between the gender of English teachers and strategy 10, the instrument or event provides information of

sufficient detail to pinpoint specific problems, such as misunderstandings, so that teachers can make good decisions about what actions to take, and with whom ($t_{(45)} = 2.53$, $p=.03$). Since the p-value is less than .05 the results are significant, the null hypothesis was rejected and the research hypothesis was accepted.

Another set of independent samples *t*-tests was conducted based on mathematics teachers' responses (Table 20). Significant differences were observed between the gender of mathematics teachers and strategy 9, the assessment instrument or event is designed so that it aligns directly with the critical learning standards to be learned ($t_{(52)} = -2.18$, $p=.03$). Since the p-value is less than .05 the results are significant, the null hypothesis was rejected and the research hypothesis was accepted. The results of the other *t*-tests had p-values greater than .05 resulting in no significant differences between gender and the remaining formative assessment strategies. The null hypothesis was accepted and the research hypothesis was rejected.

Table 20

Mean Differences in Mathematics Teachers' Responses between Formative Assessment Strategies and Gender

Strategy	Female		Male		df	t	p	Cohen's d
	M	SD	M	SD				
I communicate the critical learning standards to students in language they can understand, as a regular part of instruction.	2.81	.94	2.82	.98	52	-.05	.96	-.01
Instruction centers on the critical learning standards.	3.62	.57	3.54	.79	52	.42	.68	.12
Assignments and assessments align directly with intended critical learning standards and	3.38	.70	3.57	.57	52	-1.08	.29	-.30

Strategy	Female		Male		df	t	p	Cohen's d
	M	SD	M	SD				
instruction provided.								
Assignments and assessments are designed so that students can interpret results, in terms of intended learning. The results function as effective feedback.	3.12	.77	3.22	.85	51	-.48	.63	-.12
I use examples and models of strong and weak work to help students understand key elements of a quality response, product, or performance.	2.54	.86	2.54	.96	52	0.11	.99	0.00
I offer feedback that links directly to the intended learning, pointing out strengths and offering information to guide improvement. Students receive this feedback during the learning process and have opportunities to improve on each learning target before the graded event.	3.08	.74	3.18	.82	52	-.48	.64	-.13
I design assignments and assessments so that students can self-assess, by identifying their own strengths and areas for further study in terms of the intended learning. The results of assignments and assessments function as effective feedback to students.	2.96	.77	3.04	.84	52	-.34	.74	-.10
I use assessment information to focus instruction on a day-to-day basis.	2.88	.91	3.11	.75	51	-.99	.33	-.28
The assessment instrument or event is designed so that it aligns directly with the critical learning standards to be learned.	3.23	.77	3.64	.62	52	-2.18	.03*	-.59
The instrument or event	2.83	.72	3.21	.69	49	-1.97	.05*	-.54

Strategy	Female		Male		df	t	p	Cohen's d
	M	SD	M	SD				
provides information of sufficient detail to pinpoint specific problems, such as misunderstandings, so that teachers can make good decisions about what actions to take, and with whom.								
All of the instrument or event's items or tasks match learning targets that have been or will be taught.	3.25	.74	3.52	.75	49	-1.28	.21	-.36
I give students regular opportunities to track, reflect on, and share their achievement status and improvement.	2.96	.87	2.82	.91	52	.58	.57	.16
The results are available in time to take action with the students who generated them.	3.46	.76	3.57	.57	52	-.60	.55	-.16
*p<.05, **p<.01								

In conclusion, the null hypothesis was accepted and the research hypothesis was accepted. No statistically significant differences found between gender and the level of use of formative assessment strategies. Statistically significant differences were found between gender and specific formative assessment strategies within each content area.

Research Question 1f

Do the levels of use formative assessment practices vary by years of teaching experience?

Null Hypothesis 6

H₀₆ = There is no difference in the level of use of formative assessment practices based on years of teaching experience.

Research Hypothesis 6

H_6 = There is a difference in the level of use of formative assessment practices based on years of teaching experience.

An ANOVA was conducted to evaluate the relationship between years of teaching experience and the level of use of formative assessment practices (Table 21). The independent variable was years of teaching experience and the dependent variable was level of use of formative assessment practices composite score. The results of the ANOVA were not significant ($F_{(4,99)} = .19$, $p = .95$). The number of years of teaching experience did not change the level of use of formative assessment strategies. Therefore, the null hypothesis has been accepted and the research hypothesis has been rejected.

Table 21

Mean Differences in Years of Teaching Experience and Level of Use of Formative Assessment Strategies

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference		Min	Max	Effect Size
					Lower	Upper			
1 – 4 years	14	3.11	.36	.10	2.90	3.31	2.5	3.5	
5 – 9 years	20	3.19	.49	.11	2.96	3.41	2.4	4.0	
10 – 13 years	22	3.08	.54	.11	2.84	3.32	1.8	4.0	.09
14 – 20 years	29	3.07	.41	.08	2.92	3.23	2.0	3.6	
21 – 34 years	19	3.11	.57	.13	2.84	3.39	1.9	4.0	

Research Question 1g

Do the levels of use formative assessment practices vary by teacher degrees/ qualifications?

Null Hypothesis 7

H_{07} = There is no difference in the level of use of formative assessment practices based on teacher qualifications.

Research Hypothesis 7

H_7 = There is a difference in the level of use of formative assessment practices based on teacher qualifications.

As part of the survey, participants were asked to indicate which degrees they had earned. Only 56% teachers indicated they had earned a bachelor's degree, 44% teachers did not indicate they had earned a bachelor's degree. Teachers would have earned at least a bachelor's degree to teach. Since the data was not complete independent *t*-tests were only run for the remaining two categories with responses, master's degree and National Board Certification. None of the teachers responding to the survey indicated they had earned a doctorate.

An independent samples *t*-test was computed on variables for the differences between teacher qualifications and levels of use of assessment for learning strategies, feedback and the type of feedback provided most often (Table 22). No statistically significant differences were found between teachers with a master's degree and level of use of formative assessment strategies ($t_{(102)} = -2.42$, $p=.81$). Since the *p*-value is greater than .05 the results are not significant, the null hypothesis was accepted and the research hypothesis was rejected.

Table 22

T-test for Differences Teacher Qualifications (specifically Master's Degree) and Level of Use of Formative Assessment Strategies

	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		Cohen's d
					Lower	Upper	
Equal variances assumed	102	.81	-.03	.13	-.29	.22	-.07
Equal variances not assumed	25.252	.77	-.03	.11	-.25	.19	

An independent samples *t*-test was computed on variables for teachers with National Board Certification and levels of use of assessment for learning strategies (Table 23). There was a statistically significant difference between teachers with National Board Certification and level of use of formative assessment strategies ($t_{(102)} = 2.43$, $p=.02$). Since the *p*-value is less than .05 the results are significant, the null hypothesis was rejected and the research hypothesis was accepted.

Additional independent samples *t*-tests were computed isolating the content area on variables for teachers with National Board Certification and levels of use of assessment for learning strategies. The results for English teachers and mathematics teachers are reported in Table 23. Though there were statistically significant differences found between the combined population and National Board Certified Teachers (NBCT), when isolating the English teachers, no statistically significant differences were found ($t_{(47)} = .81$, $p=.42$); the null hypothesis was accepted and the research hypothesis was rejected. Statistically significant differences were found between mathematics teachers with NBCT and level of use of formative assessment strategies ($t_{(53)} = 2.68$, $p=.01$).

Since the p-value is less than .05 the results are significant; the null hypothesis was rejected and the research hypothesis is accepted.

Table 23

T-test for Differences Teacher Qualifications (specifically NBCT) and Level of Use of Formative Assessment Strategies

	Yes		No		df	t	p	Cohen's d
	M	SD	M	SD				
English	2.94	.57	3.09	.47	47	.81	.42	-.29
Mathematics	2.76	.56	3.21	.42	53	2.680	.01**	-.92
Combined	2.85	.55	3.16	.44	102	2.43	.02*	-.61

*p<.05, **p<.01

Research Question 1h

Do the levels of use formative assessment practices vary from participation in professional learning activities?

Null Hypothesis 8

H₀₈ = There is no difference in the level of use of formative assessment practices based on professional learning opportunities.

Research Hypothesis 8

H₈ = There is a difference in the level of use of formative assessment practices based on professional learning opportunities.

A chi-square test of independence was computed to determine associations between the categorical variables professional learning opportunities (conference/workshop, webinar, coursework, PLN, own reading) and content (English

and mathematics) (Table 24). Teachers reading on their own and content were found significantly related, $\chi^2_{(1, N=106)} = 3.74, p=.05$. There was a statistically significant relationship found between teachers reading on their own and content area taught.

Table 24

Prevalence in Content Area and Professional Learning Activities

	English		Mathematics		χ^2	Cohen's <i>d</i>
	N	%	N	%		
Conference/Workshop	24	47.1	27	52.9	.87	.18
Webinar	1	50.0	1	50.0	.91	.19
Coursework	30	53.6	26	46.4	.11	.06
Personal Learning Network	24	51.1	23	48.9	.37	.12
Own Reading	29	55.8	23	44.2	.05*	.04

* $p<.05$

A series of independent samples *t*-tests were computed on variables for the differences between professional learning opportunities and levels of use of assessment for learning strategies. A *t*-test was computed for the difference between teachers attending a conference/workshop and the level of use of formative assessment strategies (Table 25). No statistically significant differences were found between attending a conference/workshop and level of use of formative assessment strategies ($t_{(102)} = -1.45, p=.146$). The null hypothesis in this case was accepted and the research hypothesis was rejected.

Another *t*-test was computed for the difference between teachers watching a webinar and the level of use of formative assessment strategies (Table 25). Again, no statistically significant differences were found between watching a webinar and level of use of formative assessment strategies ($t_{(102)} = -.28, p=.782$). Since the p-value is greater

than .05 the results are not significant, the null hypothesis in this case was accepted and the research hypothesis was rejected.

Another independent samples *t*-test was computed for the difference between teachers completing coursework and the level of use of formative assessment strategies (Table 25). No statistically significant differences were observed between completing coursework and level of use of formative assessment strategies ($t_{(102)} = .01$, $p=.990$). The null hypothesis in this case was accepted and the research hypothesis was rejected.

An independent samples *t*-test was computed for the difference between participating in a PLN and the level of use of formative assessment strategies (Table 25). Again, there was no statistically significant differences observed between participating in a PLN and level of use of formative assessment strategies ($t_{(102)} = -.47$, $p=.637$). The null hypothesis in this case was accepted and the research hypothesis was rejected.

An independent samples *t*-test was computed for the difference between reading on their own and the level of use of formative assessment strategies (Table 25). There was no significance between participating in a PLN and level of use of formative assessment strategies ($t_{(102)} = .41$, $p=.680$). The null hypothesis in this case was accepted and the research hypothesis was rejected.

Table 25

T-test for Differences in Professional Learning Opportunities and Level of Use of Formative Assessment Strategies

	Yes		No		t	p	Cohen's d
	M	SD	M	SD			
Workshop/Conference	3.18	.47	3.04	.47	-1.46	.69	.29
Webinar	3.20	.85	3.11	.47	-.28	.26	.14

	Yes		No		t	p	Cohen's d
	M	SD	M	SD			
Coursework	3.11	.43	3.11	.52	.01	.07	.00
PLN	3.13	.47	3.09	.47	-.47	.63	.09
Own Reading	3.09	.48	3.13	.47	.41	.68	-.08

Each independent samples *t*-test computed for various professional learning opportunities and the level of use of formative assessment strategies was found not significant since $p > .05$. Since the participants were able to select more than one option, a one way ANCOVA was computed to determine significance between professional learning opportunities combined and the level of use of formative assessment strategies.

A one way ANCOVA was computed for the differences between level of use of formative assessment strategies and professional learning opportunities. The independent categorical variable had more than two categories (type of professional development) and control was added to account for years teaching as the covariate; therefore, the appropriate test of significance is an analysis of covariance (Salkind, 2011). There was a significant effect for workshops and conference $F_{(1,17)} = 6.23, p = .014$, a non-significant effect for webinar, $F_{(1,17)} = .16, p = .690$, a non-significant effect for coursework, $F_{(1,17)} = .627, p = .431$, a non-significant effect for PLN, $F_{(1,17)} = .02, p = .886$, and a non-significant effect for own reading, $F_{(1,17)} = 1.68, p = .199$. There was a significant effect for the interaction between teachers who attended workshops/conferences and read about formative assessment strategies and level of use of formative assessment strategies ($F_{(1,17)} = 6.14, p = .015$). In addition, a significant effect for the interaction between existed for teachers who attended workshops/conferences, completed coursework and participated in a PLN and level of use of formative assessment strategies ($F_{(1,17)} = 5.43, p = .022$). For

the interaction between attending a workshop/conference and completing coursework it is close to being significant ($F_{(1,17)} = 3.76, p = .056$). For the interaction between attending a workshop/conference and participating in a PLN it is close to being significant ($F_{(1,17)} = 3.59, p = .061$). There was significance found for the interaction between attending a workshop/conference with completing coursework and participating in a PLN ($F_{(1,17)} = 5.43, p = .022$). The constant in all of the above is attending a workshop. The only other combination that is close to being significant is completing coursework, participating in a PLN, and reading on their own ($F_{(1,17)} = 3.92, p = .051$). All other combinations are not found to be significant.

A second ANCOVA was computed to examine the differences between level of use of type of feedback and professional learning opportunities. There was a significant effect for the interaction between attending a workshop/conference with completing coursework ($F_{(1,17)} = 6.85, p = .010$). For the interaction between completing coursework and participating in a PLN there was a significant effect ($F_{(1,17)} = 7.66, p = .007$). The only other combination that was close to being significant is the interaction between teachers who attended a workshop/conference along with completing coursework and participating in a PLN and the level of use of types of feedback ($F_{(1,17)} = 3.65, p = .059$).

Conclusion

The first research hypothesis—that level of use of formative assessment strategies differs by content—resulted in accepting the null hypothesis. However, the relationship was found to be significant when evaluating the type of feedback use most often by English and mathematics teachers. The next set of hypothesis examined the differences in the level of use of formative and the course level and the number of preps a teacher

has. It was found there was no significance between the level of use of formative assessment strategies and course level and number of preps, therefore the null hypotheses was accepted and the research hypotheses 2 and 3 are rejected. However, the number of preps did have a significant association with the level of use of types of feedback (specific formative assessment strategy). At this level, the research hypothesis 3 was accepted.

The fourth research hypothesis that teacher's perceptions of their knowledge of these practices had a significant association with the level of use of formative assessment strategies was confirmed resulting in rejecting the null hypothesis.

The next set of hypothesis examined the differences in the level of use of formative within gender and years of teaching experience. It was observed that there was no significance between the level of use of formative assessment strategies and gender or years of teaching experience, therefore the null hypotheses was accepted and the research hypotheses 2 and 3 are rejected. The seventh research hypothesis that teacher's qualifications has a significant association with the level of use of formative assessment strategies was confirmed for teachers with National Board Certification resulting in rejecting the null hypothesis.

The eighth research hypothesis examined the difference between the level of use of formative assessment strategies and participation in professional learning opportunities was found to have no significance resulting in accepting the null hypothesis. However, further analysis found significance between levels of use of formative assessment strategies after participating in a combination of professional learning opportunities. Chapter 5 will discuss these findings further.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

With the Performance Evaluation Reform Act (PERA)'s full implementation scheduled for the 2016-17 school year, accountability based on the use of student assessment results will expand once again in Illinois. PERA will incorporate student growth into teacher's final evaluation rating, defining growth as "a demonstrable change in a student's or group of students' knowledge or skills, as evidenced by gain and/or attainment on two or more assessments, between two or more points in time" (ISBE, 2014b, p. 8). Consequently, such high-stakes assessments lead school districts to feel pressure in determining whether to invest time and resources in the development of formative assessment practices or focus on the required high-stakes summative assessments (Black, 2015).

While a large body of literature has focused on the importance, framework, and definition of formative assessments, little research has examined the successful implementation of practices or the impact of accountability measures on the implementation of assessment for learning (Hopfenbeck & Stobart, 2015). As such, this non-experimental, survey design research study examined differences between the levels of use of formative assessment strategies in junior-level English and Algebra 2 school courses, specifically including types of feedback by English and mathematics teachers.

Participants were administered a frequency scale survey on the level of use of various formative assessment strategies in their classrooms, which determined how such use varied by:

- content area taught (English vs. mathematics);
- course type within content area (accelerated courses vs. developmental courses);
- number of different courses taught; and
- teacher's perceptions of their knowledge of these practices, and other teacher demographics (e.g., gender, years of experience, degrees/ qualifications, participation in professional learning activities).

Findings and Discussion

Assessment, instruction and feedback entwined through the learning process allows teachers and students to engage and act in the learning (Guskey, 2007; Hattie & Timperley, 2007). As previously discussed, Popham (2011) defines assessment as a variety of methods and activities used to assess student knowledge. Where summative assessments are generally administered after learning to evaluate curriculum or determine students' final proficiency, formative assessments are administered during learning to help students identify misconceptions and guide continual instruction. Formative assessments therefore represent a pedagogical shift toward viewing assessment as an engrained and driving factor for instruction and learning, rather than an end product of instruction or a "peripheral component of pedagogy" (Black, 2015, p. 163). It is important to note, however, that formative assessments can be summative, and vice versa (Black, 2015). As such, how the assessment is evaluated determines whether it is formative or summative. This study used as its conceptual framework the Seven

Strategies of Assessment for Learning (Chappuis, 2015), as well as Nyquist's (2003) work on typology of feedback. The results from this study serve as a guide for developing or recommending differentiated professional learning opportunities on formative assessment practices.

The first major finding is that teachers' self-perception of their knowledge of formative assessment practices had a significant association with their level of use of such strategies. Thirty-one percent of teachers in this study indicated that they felt knowledgeable about formative assessment strategies with a mean score of 3.30 (on a 1-4 scale) for the level of use of formative assessment strategies as opposed to only 12% of teachers who do not feel knowledgeable about formative assessment strategies with a mean score of 2.85 for the level of use of formative assessment strategies. Therefore, there is a statistically significant effect for perceptions of their own knowledge and level of use of formative assessment strategies ($F_{(4,98)} = 5.25, p = .01$). This research indicates that participating in training might not be enough to ensure implementation of formative assessment strategies, a teacher's self-perception of their knowledge is a factor in whether or not the strategies will be implemented. The literature review indicated that not all teachers, including novice teachers, receive formal training in formative assessment strategies therefore feeling not prepared to assess student learning (Campbell & Evan, 2000; Guskey, 2003; Mertler, 2004). Understanding this relationship is important given the impact of formative assessment strategies on student achievement (Black & Wiliam, 1998a; Hattie & Timperley, 2007; Wiliam, 2005) which could have an impact on teacher evaluation ratings under the new PERA guidelines. As previously stated, Wiggins (1998) reported excellent teachers depend on accountability. It could be deduced by adding

student growth to teacher evaluation ratings and teachers understanding the impact of formative assessment strategies on student learning, the excellent teachers would implement formative assessment practices.

The second major finding is that participating in professional development activities has a significant association with the levels of use of formative assessment strategies. This study found that participation in coursework and a workshop on formative assessment strategies has a significant association with the levels of use of formative assessment strategies ($F_{(1,17)} = 6.23, p = .014$). In addition, participation in workshops/conferences on formative assessment strategies in combination with reading about the topic ($F_{(1,17)} = 6.14, p = .015$) or participating in a PLN ($F_{(1,17)} = 5.43, p = .022$), has a significant association with the levels of use of such strategies, as did achievement of a National Board certification ($t_{(102)} = 2.43, p = .02$). Regarding the latter factor, however, though significance is found as a combined group (English and mathematics teachers), further review among individual groups indicated a correlation between National Board certification and mathematics teachers only ($t_{(53)} = 2.68, p = .01$). It was expected a National Board Certified teacher would have higher levels of use of formative assessment strategies; it is surprising to find the certification is only statistically significant for mathematics teachers. It might suggest that English teachers were exposed more to formative assessment practices during their undergraduate coursework than mathematics teachers. This could only be confirmed with further research.

Stiggins' (2008) manifesto proclaimed the importance of a balanced assessment system. In a balanced assessment system, formative and summative assessments are companions in aiding students to be independent learners. However, many educators

hold misconceptions regarding what a balanced assessment system is, and therefore fail to understand how these two forms of assessment can work together to increase student achievement (Black 2015; Erkens, 2015). Understanding teachers' comprehension of assessment literacy, and formative assessment strategies more broadly, will assist leaders in developing professional learning opportunities on assessment literacy.

The third finding is that the content area taught (English or mathematics) did have a significant association with the type of feedback provided to students most often ($\chi^2_{(1, N=103)} = 11.65, p=.020$). English teachers most often (53%) used moderate formative assessment (where students are given information about the correct response, explanation, and suggestions for improvement) (Nyquist, 2003). Mathematics teachers most often (33%) used weak formative assessment (where students are given information about the correct response and some explanation) (Nyquist, 2003). Only 12% of English teachers and nine percent of mathematics teachers surveyed use the highest level of feedback (strong formative assessment), where students are given information about the correct response, some explanation, suggestions for improvement, and specific activities to improve learning (Nyquist, 2003). This is notable especially in comparison with the number of English teachers (6%) and mathematics teachers (15%) who provided weaker feedback (only a grade or score). The significance of this finding is a percentage of teachers providing the minimal level of feedback indicating a need for professional development to assist teachers move towards instructional feedback to move students forward in their learning.

A key component of formative assessment strategies is teacher-student feedback. Participants indicated most often (12%) use strong formative assessment feedback

(students are given information about the correct response, some explanations, suggestions for improvement and students are assigned specific activities to improve student understanding of the strong concepts) (Nyquist, 2003). English teachers almost always (43%) and mathematics teachers almost always (32%) offer feedback that links directly to the intended learning target, furthermore students receive the feedback during the learning process and have opportunities to improve on each learning target before the graded event. An interesting contradiction has emerged; though English teachers most often (12%) use strong formative assessment, 43% almost always allow students several opportunities to demonstrate learning. The difference between these two questions on the survey is that strong formative assessment includes assigning students activities to improve learning, where the latter question asks only if students were given multiple opportunities to improve their learning before the final assessment. Further research would include asking if the students are correcting the same assignments over again (e.g., paper revisions, quiz or assignment corrections) or if they are receiving new assignments to further their understanding of the learning standards.

When students are only given a grade, their level of involvement in their academics is impacted, not necessarily their academic performance (Butler, 1987). This indicates the percentage of teachers still focusing on correctional feedback rather than instructional feedback as defined by Hattie and Timperley (2007). As Tomlinson (2014) found feedback is powerful when the students do the thinking, this research indicates students are being required to think only and take action when teachers require students to complete specific activities to improve understanding (strong formative assessment). The formative assessment process includes the conversational process of a feedback loop

which translates to greater dialogue and sharing of learning between students and teachers. As the literature has reported, providing feedback is a skill requiring teachers to understand the impact of how the feedback is being delivered to and received by the student. If students do not understand the feedback, the understanding of how to act on it fails (Sadler, 2010). In addition, students might see the grade as a signal that the learning is over (Erkens, 2012).

Less than 15% of teachers in this research study use strong formative assessment feedback. Bangert-Drowns et al. (1991) found using strong formative assessment feedback that encourages students to further learning activities has a more profound effect on student learning. Students generally view assessments as an indication of their mastery over taught material, as represented typically by a letter grade (Black, 2015). Formative assessments, however, provide a platform for an open exchange between teacher and student (feedback loop) that assists students to move to the next level of learning (Duncan, 2007; Guskey, 2005; Hattie & Timperley, 2007). Feedback is thus the bridge between the learning standards taught in the classroom and the review of learning (Black, 2015). Wiliam and Thompson (2007) reports that when the descriptive feedback is aligned to the intended learning it has a greater impact on student achievement. Britton (2011) suggests revising assignments provides opportunities for practice to learn the skills before the final assessment.

The fourth finding is that there is little variability in the level of use of formative assessment strategies by teacher demographics. The overall levels of use of formative assessment strategies does not vary by course level (developmental, average, and accelerated coursework), number of teaching preps, gender, or years of teaching

experience. However, the number of preps does have a significant association with the level of use of types of feedback, which varied between one and two preps ($F_{(4,98)} = 2.89$, $p = .03$). Additionally, the gender of English teachers does have an association with the specific feedback strategies used, particularly concerning the manner in which teachers communicated critical learning standards to students. Aspects such as the accessibility of language used ($t_{(45)} = 3.53$, $p = .00$), the alignment of learning standards and instruction ($t_{(44)} = 2.05$, $p = .05$), the goal/focus of feedback prior to grading ($t_{(45)} = 2.39$, $p = .02$), and the providing enough information of sufficient detail to pinpoint specific misunderstandings ($t_{(45)} = 2.53$, $p = .03$) also varied between female and male English teachers. Female English teachers used these strategies at higher levels of use and frequency than male teachers.

For mathematics teachers, little variability regarding feedback strategies occurred based on gender; the only difference here concerned how assessment instruments or events were designed in relation to critical learning standards ($t_{(52)} = -2.18$, $p = .03$). Male mathematics teachers reported a higher level of frequency of this strategy than female mathematics teachers. If teachers are working collaboratively within professional learning teams, the effective formative assessment strategies being used by individual teachers could become the effective formative assessment strategies used by all the teachers within the professional learning team. However, teachers have to understand what it is they are doing well and feel that they are knowledgeable as stated in the first finding in order to share.

The final finding is that teachers are not always using effective formative assessment strategies during instruction. Teachers and students typically answer three

questions when using assessments formatively: “Where am I going?” “Where am I now?” and “How can I close the gap?” Chappuis (2015) developed a self-assessment for teachers to reflect on how sounding they are implementing the first three strategies of the Seven Strategies of Assessment for Learning. The first two strategies answer, “Where am I going?” and the third strategy aim to answer “Where am I now?” The findings from the survey indicate the percentage of English and mathematics teachers *almost always* employing each of these strategies:

- Twenty-nine percent of English teachers and 26% of mathematics teachers communicate the critical learning standards to students in language they can understand as a regular part of instruction.
- Forty-three percent of English teachers and 66% of mathematics teachers reported that they center instruction on critical learning standards.
- Forty-eight percent of English teachers and 56% of mathematics teachers reported they create assignments and assessment aligned directly with intended critical learning standards and instruction provided.
- Twenty-seven percent of English teachers and 39% of mathematics teachers reported they design assignments and assessments so that students can interpret results, in terms of intended learning.

The results function as effective feedback. The low and inconsistent results, indicates a possible reason why there is a considerable amount of variability that exists between types of feedback and its impact on learning (Hattie, 2009). If these results represent the larger population, two-thirds of teachers are not using effective feedback on a consistent basis.

The findings indicate the percentage of English teachers *almost always* employing each of these strategies:

- clear learning targets (29%),
- clarifying criteria for success (33%);
- providing examples of strong and weak performance (33%);
- providing descriptive feedback that moves learners forward (43%);
- activating students as owners of their own learning by teaching them to self-assess (29%); and
- set learning goals (23%).

The percentage of mathematics teachers almost always employing each of these strategies:

- clear learning targets (26%);
- clarifying criteria for success (16%);
- providing examples of strong and weak performance (16%);
- providing descriptive feedback that moves learners forward (32%);
- activating students as owners of their own learning by teaching them to self-assess (27%); and
- set learning goals (30%).

Not all types of feedback move students forward in their learning (Hattie & Timperley, 2007; Kluger & DeNisi, 1996). Therefore, use of formative assessments alone does not necessarily imply teachers are using such assessments to adapt future teaching (Wylie & Lyon, 2014). The formative assessment process includes providing students with clear learning targets, clarifying criteria for success, providing examples of

strong and weak performance, providing descriptive feedback that moves learners forward, and activating students as owners of their own learning by teaching them to self-assess and set learning goals (Chappuis, 2005; Wiliam, 2009). Black and Wiliam (1998b) suggested three key factors to maximize gains in student achievement: (a) accuracy of classroom assessment, (b) descriptive (not judgmental) feedback, and (c) student involvement in the assessment process. With the understanding that teacher evaluation will in part be based on the attainment of standards or academic growth, this research reports on average one-third of teachers are employing effective formative assessment strategies on a consistent basis.

At the core of teaching, assessment for learning should be paramount to allow for both corrective and enhancing instruction (Chappuis, 2015; Reeves, 2007; Tomlinson, 2014). Participants in this study are not following effective formative assessment practices as reported by Black and Wiliam (1998a), Chappuis (2009), Hattie & Timperley (2007), or Wiliam (2006). Chappuis and Stiggins (2002) suggest assessment for learning is based on sound research; therefore following the strategies explicitly will impact student achievement. Without the inclusion of formative assessment practices, instruction is simply covering content (Erkens, 2015; Shepard, 2009).

Limitations

While the findings in the current study are valuable in understanding the levels of use of formative assessment strategies by English and mathematics teachers, the following limitations may have impacted the study's results:

- 1) The study is restricted to one school district in a northwest suburb of Chicago, Illinois, which limits its generalizability to other high school teachers. Surveying one district limits teacher demographics and vision of school district staff.
- 2) The researcher's current administrative position within the district could have impacted the response rate as well as how participants responded.
- 3) The study is limited to two disciplines and a small number of courses (junior-level English and Algebra 2), which could impact its applicability to other contexts. This sample was further decreased during analysis. Responses from the participants on their second junior-level English or Algebra 2 course were not used as the number of respondents was not high enough for analysis, and no significance was found between the level of use of formative assessment strategies and academic course level ($F(2,96) = 1.58, p = .21$).
- 4) Participants' responses to the survey could be biased based on their experiences with and knowledge of formative assessments. The district is in the pilot year of using assessment data for student growth as part of the teacher evaluation system. Likewise, teachers' views concerning the use of this data could have impacted their responses. In addition, participants may have held inconsistent definitions of formative assessment and/or varied in their methods of implementation.
- 5) The use of a one-level data analysis method did not allow for the comparison of teacher reports to student reports of formative assessment and feedback practices, which may have led to an incomplete analysis by relying on teacher responses only.

Despite these limitations, the value of this study is the differences that exist in the level and use of formative assessment strategies and the types of feedback provided most often to students. In order to close the gap in implementation of such strategies among teachers the results of this study function as effective feedback to educators. Based on these results professional learning activities can be differentiated depending on participants current practices compared to implementing effective practices. The survey was designed as a self-assessment for educators to identify their own strengths in formative assessment practices and areas for further study in terms of learning effective formative assessment strategies. Or, the results of this study can be used to generalize to the larger population and professional learning activities can be created to assist teachers close the implementation gap of formative assessment strategies.

Future Research

Such limitations underscore the need for future research into this topic. The following presents four recommendations for future research. First, future research could replicate the validity of this study with external effectiveness data (e.g., teacher observations and interviews). Though this study does not report on teacher responses to the survey for the second course level, it is noted that a few participants indicated a difference in frequency of use of formative assessment strategies. A follow-up study could interview participants to gain information on why such differences exist, and further probe teachers' understanding of formative assessment practices and its impact on student learning. Additional research could also document the different formative assessment practices implemented into the classroom by collecting data through surveys or anecdotal observations.

Second, as student voice is missing from this study, future research could focus on students' perceptions of formative assessment in order to determine how student views compare to teacher responses. Hattie (2012) reports teachers should assist students to understand how to receive and interpret feedback, in order to increase students' understanding of and engagement with the learning process. Though this study examined differences between the levels of use of various types of feedback, more research is needed to determine if students and teachers agree on the types of feedback being used. Future research could also ask both teachers and students if such instruction occurs, and to what effect.

Third, to expand the scope of the study, future research could include participants from multiple school districts across multiple disciplines. Understanding the differences across disciplines would assist in the design and development of professional learning opportunities. Such research could ask, for example, if differences exist by content area between teachers with National Board Certification and the levels of use of formative assessment strategies. Future studies could also evaluate the impact of formative assessment strategies based on the attainment of academic standards.

Lastly, further research could evaluate teachers' understanding of various types of feedback and the differences between them. Feedback is instructionally a powerful tool, but the least understood (Cohen, 1985). Teachers' perceptions of the types of feedback could be compared to students' perceptions of the types of feedback they receive. The power of feedback supporting learning and not doing that thinking for the student occurs when it evolves during the learning process and is descriptive enough that the students know what is expected of them to make gains in their learning (Stiggins et al., 2006).

Though the learner is in a position to receive the feedback, he or she does not always understand it or see the benefit of the feedback provided (Price et al., 2010). Further research would include determining the effectiveness of teacher feedback through the students' perspective.

Recommendations

Within a balanced assessment system, determination of progress and attainment of learning standards can coexist. It is clear from this study that in order for teachers to use best assessment practices, they need to feel knowledgeable of those strategies and practices. It is important for school instructional leaders to be aware and knowledgeable of their staffs' knowledge of formative assessment practices. Implementation of formative assessment practices should therefore include the following recommendations:

- 1) District and school improvement plans should include school-wide long-term and short-term plans for developing teachers' capacity to administer and use formative assessment practices built within instructional practices.
- 2) District and school improvement plans should include standards reporting. Best practices require teachers to base assessments and assignments on learning standards. Having a standards reporting system will complement the learning process, by increasing both teachers' and students' understanding of each identified learning standard.
- 3) District and school professional development plans should include defining not only assessment of/for learning, but also the various types of feedback (including examples).

- 4) Teachers should engage in a variety of professional learning activities. If possible, one of the activities should include completing coursework for assessment practices. If the professional learning opportunity is school-based, teachers should complete a self-assessment on implementation of formative assessment practices in order to differentiate instruction.
- 5) Teachers should work in professional learning communities on formative assessment practices, providing specific norms to enhance effectiveness and efficiency including but not limited to developing protocols for essential strategies to use in the learning process, and discussing how learning is communicated back to students.
- 6) The State Board of Education should require assessment literacy in teaching programs and for certification renewal. More specifically, all teachers should be required to meet standards of professional competence on assessment practices.

Concluding Remarks

The accountability measures and learning demands facing teachers and students are complex issues. Studies have repeatedly indicated that formative assessment practices increase student learning, for learner engagement is paramount (e.g., descriptive feedback moving students forward, student involvement, examples of student work, and alignment to standards). Students need to be actively engaged in their learning, constantly assessing where they are now and where they need to be (Chappuis, 2015). Consistent formative assessment allows for accurate data for actionable feedback to adjust teaching and offers the greatest capacity for students' learning development. As

Chappuis (2009) states, “Formative assessment is a powerful tool in the hands of both teachers and students” (p. 9).

Despite the value placed on assessments in education for school accountability and teacher evaluation, not all teachers have received formal training in assessment literacy (DeLuca & Bellera, 2013; Guskey, 2003; Mertler, 2004). Teachers consistently report that they lack the confidence and skills to write their own assessments, and therefore feel unprepared to assess student learning (Black, 2015; Campbell & Evans, 2000; Mertler, 2004). In no particular order, professional organizations such as the National Education Association, the American Federation of Teachers, the National Council for Accreditation of Teacher Education, and the National Board of Professional Teacher Standards have all agreed that teacher assessment literacy should be a component of teaching standards and expectations (Stiggins, 1999). However, improving assessment practices requires sustained professional learning opportunities, not just one-off instruction (Black, 2015). Brookhart, Moss, and Long (2010) found teachers who collaborated on formative assessment strategies had greater awareness and as a result were more intentional with the implementation of their strategies. This study further underscores the need for such professional development, for it found that teachers who have earned National Board Certification, participated in a combination of professional learning activities, and felt knowledgeable about formative assessment strategies were more likely to use formative assessment strategies.

This study can aid in the development of such professional learning opportunities as it identifies potential gaps in the implementation of formative assessment strategies. The survey used in this study asked teachers to respond to their levels of use of specific

formative assessment strategies. The results indicate gaps in implementation leaders can use to create differentiated professional learning opportunities on formative assessment strategies. For example, mathematics teachers tend to give grades only for a high percentage of their assessments. Wiggins (2012) reported relying on grades alone does not help the student to improve as grades tend to be ubiquitous. Moreover, providing grades or marks alone does not increase student achievement (Butler, 1988; Hattie & Timperley, 2007). If the trends illustrated in this research regarding the provision of weak formative assessment are consistent in the entire teaching population, this points to an urgent need for more professional development on types of feedback in order to increase student achievement.

Though research indicates formative assessment practices and feedback has a statistically significant impact on student learning, the results of this study found varying degrees of the levels of use of formative assessment strategies and specifically feedback practices among high school English and mathematics teachers. If these results are consistent across the entire teaching population, leaders have more work to do to make the greatest impact on student academic growth and learning especially in light of the implementation of PERA. These differences indicate a need for more professional development on both formative assessment strategies and types of feedback in order to increase student achievement and academic growth.

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APPENDIX A: SURVEY INSTRUMENT

FREQUENCY OF FORMATIVE ASSESSMENT STRATEGIES

Section 1. Professional Characteristics & Background
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Instructions: Please select the response that best reflects your current situation.

1) Please indicate which content area you currently teach:

- ☐ English ☐ Mathematics

2) How many different course(s) do you currently teach?

- ☐ 1 course ☐ 4 courses
- ☐ 2 courses ☐ 5 courses
- ☐ 3 courses

3) How many years have you been a teacher? _____ years

4) How many years have you taught in District 211? _____ years

5) Please select which course(s) you currently teach (Select all that apply).

- | | |
|--|---|
| <input type="radio"/> E301 English III | <input type="radio"/> M308 Advanced Algebra II |
| <input type="radio"/> E302 English III | <input type="radio"/> M314 Algebra II |
| <input type="radio"/> E331 American Studies | <input type="radio"/> M317 Algebra II |
| <input type="radio"/> E336 American Studies | <input type="radio"/> M328 Accelerated Algebra II |
| <input type="radio"/> E319 AP Language/Composition | <input type="radio"/> M348 Advanced Algebra II |

Section 2 Formative Assessment Strategies

This set of questions will focus on the various types of formative assessment strategies you use in your classroom.

- 6) Prior to answering the formative assessment strategy questions below, please tell me which course you will be reflecting upon (Select only one).

If you teach more than one course, you will have an opportunity to reflect on your other course later in the survey.

- | | |
|--|---|
| <input type="radio"/> E301 English III | <input type="radio"/> M308 Advanced Algebra II |
| <input type="radio"/> E302 English III | <input type="radio"/> M314 Algebra II |
| <input type="radio"/> E331 American Studies | <input type="radio"/> M317 Algebra II |
| <input type="radio"/> E336 American Studies | <input type="radio"/> M328 Accelerated Algebra II |
| <input type="radio"/> E319 AP Language/Composition | <input type="radio"/> M348 Advanced Algebra II |

- 7) To what extent do the following statements categorize the frequency of formative assessment strategies you use? (Select only one response per question)

	Almost Never	Sometimes	Usually	Almost Always
(a) I communicate the critical learning standards to students in language they can understand, as a regular part of instruction.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(b) Instruction centers on the critical learning standards.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(c) Assignments and assessments align directly with intended critical learning standards and instruction provided.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(d) Assignments and assessments are designed so that students can interpret results, in terms of intended learning. The results function as effective feedback.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(e) I use examples and models of strong and weak work to help students understand key elements of a quality response, product, or performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(f) I offer feedback that links directly to the intended learning, pointing out strengths and offering information to guide improvement. Students receive this feedback during the learning process and have opportunities to improve on each learning target before the graded event.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(g) I design assignments and assessments so that students can self-assess, by identifying their own strengths and areas for further study in terms of the intended learning. The results of assignments and assessments function as effective feedback to students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(h) I use assessment information to focus instruction on a day-to-day basis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(i) The assessment instrument or event is designed so that it aligns directly with the critical learning standards to be learned.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(j) The instrument or event provides information of sufficient detail to pinpoint specific problems, such as misunderstandings, so that teachers can make good decisions about what actions to take, and with whom.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(k) All of the instrument or event's items or tasks match learning targets that have been or will be taught.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(l) I give students regular opportunities to track, reflect on, and share their achievement status and improvement.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(m) The results are available in time to take action with the students who generated them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section 3. Feedback

This next set of questions will focus on the level of formative feedback you use in your classroom.

- 8) To what extent do the following statements categorize the frequency of feedback strategies you use? (Select only one response per question)

	Almost Never	Sometimes	Usually	Almost Always
(a) Students are given only a grade or score	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(b) Students are provided a grade or scores and clear statements on corrective knowledge to correct their answers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(c) Students are given both information about the correct response and some explanation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(d) Students are given information about the correct response, some explanation and suggestions for improvement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(e) Students are given information about the correct response, some explanation, suggestions for improvement and students are assigned specific activities to improve student understanding of the concepts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section 4. Responses for additional course taught

- 9) Please select the second course you currently teach.

- | | |
|--|---|
| <input type="radio"/> E301 English III | <input type="radio"/> M308 Advanced Algebra II |
| <input type="radio"/> E302 English III | <input type="radio"/> M314 Algebra II |
| <input type="radio"/> E331 American Studies | <input type="radio"/> M317 Algebra II |
| <input type="radio"/> E336 American Studies | <input type="radio"/> M328 Accelerated Algebra II |
| <input type="radio"/> E319 AP Language/Composition | <input type="radio"/> M348 Advanced Algebra II |

- 10) To what extent do the following statements categorize the frequency of formative assessment strategies you use? (Select only one response per question)

	Almost Never	Sometimes	Usually	Almost Always
(a) I communicate the critical learning standards to students in language they can understand, as a regular part of instruction.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(b) Instruction centers on the critical learning standards.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(c) Assignments and assessments align directly with intended critical learning standards and instruction provided.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(d) Assignments and assessments are designed so that students can interpret results, in terms of intended learning. The results function as effective feedback.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(e) I use examples and models of strong and weak work to help students understand key elements of a quality response, product, or performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(f) I offer feedback that links directly to the intended learning, pointing out strengths and offering information to guide improvement. Students receive this feedback during the learning process and have opportunities to improve on each learning target before the graded event.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(g) I design assignments and assessments so that students can self-assess, by identifying their own strengths and areas for further study in terms of the intended learning. The results of assignments and assessments function as effective feedback to students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(h) I use assessment information to focus instruction on a day-to-day basis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(i) The assessment instrument or event is designed so that it aligns directly with the critical learning standards to be learned.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(j) The instrument or event provides information of sufficient detail to pinpoint specific problems, such as misunderstandings, so that teachers can make good decisions about what actions to take, and with whom.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(k) All of the instrument or event's items or tasks match learning targets that have been or will be taught.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(l) I give students regular opportunities to track, reflect on, and share their achievement status and improvement.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(m) The results are available in time to take action with the students who generated them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructions: Please indicate frequency and the extent to which you provide the type of feedback listed below for the class you selected in Question 9.

- 11) To what extent do the following statements categorize the frequency of feedback strategies you use? (Select only one response per question)

	Almost Never	Sometimes	Usually	Almost Always
(a) Students are given only a grade or score.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(b) Students are not only provided a grade or scores, but also they are provided clear statements on corrective knowledge to correct their answers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(c) Students are given both information about the correct response and some explanation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(d) Students are given information about the correct response, some explanation and suggestions for improvement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(e) Students are given information about the correct response, some explanation, suggestions for improvement and students are assigned specific activities to improve student understanding of the concepts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section 5. Responses for Additional Professional Characteristics & Background

- 12) How much do you feel you know about formative assessment strategies?

- ☐ I feel I need to know more
☐ I feel I have a basic understanding
☐ I feel very knowledgeable

13) Where did you obtain your knowledge of formative assessment strategies? (Select all that apply)

- ☐ Workshop or conference
- ☐ Webinar
- ☐ Coursework
- ☐ Personal Learning Network (PLN)
- ☐ Reading on my own
- ☐ Other _____

14) What degrees/qualifications have you attained? (Select all that apply)

- ☐ Associates ☐ Doctoral
- ☐ Bachelors ☐ National Board Certified
- ☐ Masters ☐ Other _____

15) Gender

- ☐ Female ☐ Male

Thank you for your participation in this survey!

APPENDIX B: INFORMED CONSENT

Dear Participant:

My name is Danielle Hauser; I am a doctoral student under the direction of Dr. Steve Mertens in the Department of Teaching and Learning at Illinois State University. I am conducting research examining the degree of association between formative assessment strategies, specifically feedback and student attainment of standards.

If you choose to participate, it will involve answering questions regarding your frequency and use of formative assessment strategies. You will also be asked to provide some basic demographic information. This survey should take approximately 15-20 minutes of your time.

Please be aware your participation in this study is voluntary. You are not expected to participate. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. The results of the research study may be published, but all surveys are completely anonymous, therefore your name will not be connected to results or used in any way. The information provided will not be used in any way to impact teacher evaluation.

The goal is to benefit your field of teaching and learning, however, there may be no direct benefit to you. The possible benefit of your participation is further understanding and training of using formative assessment strategies.

If you would like to participate in this research study, please click on (or copy and paste) the link below:

[Survey Link]

If you have questions, please reply to this email or call me at (847) 224-9899 or Dr. Steve Mertens at (309) 438-8182 with your interest. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Research Ethics and Compliance Office at Illinois State University.

Thank you for willingness and consideration to participate in this research study.

Sincerely,

Danielle Hauser

APPENDIX C: TEACHERS RESPONSES TO FORMATIVE ASSESSMENT STRATEGY QUESTIONS

Teachers Responses to Formative Assessment Strategy Questions

Assessment Strategies	Percent of Teachers Responding									
	English					Mathematics				
	N	Almost Never	Sometimes	Usually	Almost Always	N	Almost Never	Sometimes	Usually	Almost Always
Instruction centers on the critical learning standards.	49	2	14	41	43	56	2	5	27	66
The results are available in time to take action with the students who generated them.	49	0	20	31	49	55	0	9	31	60
The assessment instrument or event is designed so that it aligns directly with the critical learning standards to be learned.	49	4	10	53	33	55	0	13	29	58
Assignments and assessments align directly with intended critical learning standards and instruction provided.	48	0	15	38	48	57	2	7	35	56

Assessment Strategies	Percent of Teachers Responding									
	English					Mathematics				
	N	Almost Never	Sometimes	Usually	Almost Always	N	Almost Never	Sometimes	Usually	Almost Always
All of the instrument or event's items or tasks match learning targets that have been or will be taught.	49	2	12	55	31	52	0	15	31	54
Assignments and assessments are designed so that students can interpret results, in terms of intended learning. The results function as effective feedback.	49	4	18	41	27	56	4	18	39	39
150 I offer feedback that links directly to the intended learning, pointing out strengths and offering information to guide improvement. Students receive this feedback during the learning process and have opportunities to improve on each learning target before the graded event.	49	0	20	37	43	57	4	14	51	32
I use assessment information to focus instruction on a day-to-day basis.	48	2	31	44	23	54	4	22	43	31

Assessment Strategies	Percent of Teachers Responding									
	English					Mathematics				
	N	Almost Never	Sometimes	Usually	Almost Always	N	Almost Never	Sometimes	Usually	Almost Always
I design assignments and assessments so that students can self-assess, by identifying their own strengths and areas for further study in terms of the intended learning. The results of assignments and assessments function as effective feedback to students.	48	6	25	46	23	57	0	32	39	30
151 The instrument or event provides information of sufficient detail to pinpoint specific problems, such as misunderstandings, so that teachers can make good decisions about what actions to take, and with whom.	49	4	24	45	27	52	0	23	48	29
I communicate the critical learning standards to students in language they can understand, as a regular part of instruction.	49	6	29	37	29	57	9	28	37	26

Assessment Strategies	Percent of Teachers Responding									
	English					Mathematics				
	N	Almost Never	Sometimes	Usually	Almost Always	N	Almost Never	Sometimes	Usually	Almost Always
I give students regular opportunities to track, reflect on, and share their achievement status and improvement.	48	0	38	33	29	55	5	27	49	27
I use examples and models of strong and weak work to help students understand key elements of a quality response, product, or performance.	49	6	29	33	33	57	12	29	33	16

APPENDIX D: TEACHERS RESPONSES TO TYPE OF FEEDBACK QUESTIONS

Teachers Responses to Type of Feedback Questions

Types of Feedback	Percent of Teachers Responding									
	English					Mathematics				
	N	Almost Never	Sometimes	Usually	Almost Always	N	Almost Never	Sometimes	Usually	Almost Always
Students are given only a grade or score (Weaker Feedback Only)	49	59	31	6	4	53	32	25	28	15
Students are not only provided a grade or scores, but also they are provided clear statements on corrective knowledge to correct their answers (Feedback Only).	49	0	12	45	43	54	6	24	39	31
Students are given both information about the correct response and some explanation (Weak Formative Assessment).	49	4	14	41	41	54	6	13	37	44

Types of Feedback	Percent of Teachers Responding									
	English					Mathematics				
	N	Almost Never	Sometimes	Usually	Almost Always	N	Almost Never	Sometimes	Usually	Almost Always
Students are given information about the correct response, some explanation and suggestions for improvement (Moderate Formative Assessment).	48	2	10	50	38	53	8	26	36	30
154 Students are given information about the correct response, some explanation, suggestions for improvement and students are assigned specific activities to improve student understanding of the concepts (Strong Formative Assessment).	49	12	37	39	12	54	19	43	30	9